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BULLETIN

OF THE

NATURAL HISTORY SOCIETY

OF

NEW BRUNSWICK.

No. I.

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ADVERTISEMENT.

THE want of a medium of publication of its proceedings, etc., has been felt for some time by the NATURAL HISTORY SOCIETY, and the issue of this BULLETIN has been commenced to supply this want.

It is intended to continue the publication in this form, from time to time, of original articles read before the Society; and the Council request that other Societies and Public Bodies who may receive it, will send their publications in return.

M. CHAMBERLAIN,
ROBERT CHALMERS,
GEORGE U. HAY,
Publishing Committee.

BULLETIN

OF THE

NATURAL HISTORY SOCIETY OF NEW BRUNSWICK.

No. I.—1882.

SUMMARY OF MEETINGS.

SAINT JOHN, *February 1st, 1881.*

AT the regular meeting of the Society this evening, Dr. BOTSFORD in the chair, G. F. MATTHEW, Esq., delivered an address, showing in brief the work done by geologists in this Province during the past forty-two years.

March 1st, 1881.

Mr. ROBERT CHALMERS read a paper this evening on the evidences of glacial action on the shores of the Baie de Chaleur. He described this evidence, which seemed to point unmistakably to the fact that the bed of this Bay was once the seat of a glacier, some one hundred and fifty miles in length, twenty-five to fifty in width, and in some places not less than one thousand feet in depth, moving eastward, and being probably a small independent glacier,—a portion left on the breaking up of the great ice sheet which had previously extended over the whole of this section of the continent.

April 5th, 1881.

A paper on "Medicinal Plants," from the pen of Dr. DUNCAN, of Bathurst, was read this evening, and, on motion, was ordered to be published.

May 3rd, 1881.

Dr. L. C. ALLISON delivered an address at the regular meeting this evening on "Diatoms," illustrating his remarks by diagrams and by microscopic preparations.

June 7th, 1881.

At the regular meeting this evening the President, Dr. BOTSFORD, had occasion to congratulate the members on their occupying new and commodious apartments in the Market Building. He reviewed the history of the Society, and expressed satisfaction at its sound position and good prospects.

Dr. COLEMAN delivered an address on the "Circulation of the Blood."

July 5th, 1881.

This being the first regular meeting of the Society after the field meeting of June, the leaders of the different sections of that day were called upon for reports, and responded as follows: Dr. L. C. ALLISON, address on Invertebrates, illustrated by specimens and diagrams; Mrs. C. E. HEUSTIS, on Entomology, with specimens; Mr. G. U. HAY, on Botany, with specimens, notably the *Drosera rotundifolia*, with experiments illustrating the apparently insectivorous nature of this plant; Mr. MATTHEW, on the Geology of Torryburn Lake District.

August 2nd, 1881.

Vice-President GEN. WARNER presided at the meeting held this evening. A paper on the *Radiata* was read by Professor BAILEY of New Brunswick University.

September 6th, 1881.

The paper of the evening was read by Mr. C. H. FLEWELLING, and was a history of the growth and progress of Engraving and Printing.

October 4th, 1881.

A collection of plants from A. I. TRUEMAN, Esq., representing the flora of sections of the Upper Saint John, and portions of the

County of Westmorland, was presented to the Society. The paper of the evening, on the "Growth of the English Language," was read by G. HERBERT LEE, Esq.

November 1st, 1881.

Notice was given that the rooms of the Society would be open to members on the evening of the third Tuesday of each month as well as on the first Tuesday. The paper of the evening, on "Applied Chemistry," was read by Mr. W. F. BEST. He laid stress on the fact that much raw material in the Province which might be utilized is either suffered to lie idle or go to waste: as hardwood, for the manufacture of acetic acid; and charcoal-ammonia, a by-product of the gas works of this city, and others.

December 6th, 1881.

A paper on the "Birds of Prey of New Brunswick" was read by Mr. M. CHAMBERLAIN. Many points of interest are embodied in a Catalogue of the Birds of the Province, prepared by Mr. CHAMBERLAIN, and published in this Bulletin.

January 3rd, 1882.

The paper of this evening was read by Mr. W. N. GOULD, on the "Insects injurious to the Coniferæ of New Brunswick." The principal of these, said Mr. Gould, belonged to the order Coleoptera, and to the families Scolytidæ, Prionidæ, Callidium, &c. The bark beetles—sappers and miners of the army—belong to the first family. These and their methods of work and results were described by Mr. Gould, as were also the members of other families. The enemies of these destroyers were the birds, and they were doing a noble work. The black-capped and Hudson Bay titmouse, sparrows and other common birds are very active in the destruction of these pests; but there is no hope of the birds being able to check the increase of these insects as long as the farmer allows his stumps to stand until they rot, instead of burning them the first year, and as long as he builds his fences of evergreen trees without first stripping off the bark. The tops, limbs, and stumps left to rot by lumberers are vast nurseries of insects, which are sending forth ever increasing armies which, if not arrested, will in a few years destroy the young coniferous forests of New Brunswick. The only check to the multiplication of these pests is to burn all stumps, tops, brush, and injured trees each year, wherever man destroys the forest.

ELEVENTH ANNUAL REPORT

OF THE

NATURAL HISTORY SOCIETY OF NEW BRUNSWICK.

SAINT JOHN, *January 17th, 1882.*

THE eleventh annual meeting of this Society was held in their rooms in the Market Building this evening, Dr. LEB. BOTSFORD, President, in the chair.

After some routine business was disposed of, the Recording Secretary presented the annual report of the Council, which, on motion, was received and ordered to be entered on the Minutes, and is as follows:

The Council of the NATURAL HISTORY SOCIETY OF NEW BRUNSWICK, in presenting their eleventh annual report, feel warranted in congratulating the members on the success which has attended their efforts during the past year in the prosecution of those objects for which the Society was formed, and on the satisfactory progress which has been made. The details of this progress will be briefly brought before you under the various heads.

During the year arrangements have been made for the admission of ladies as associate members to certain of the privileges of the Society.

The roll of membership is as follows, viz:

1	Honorary member.
6	Life members.
60	Ordinary members.
17	Associate members.
22	Corresponding members.

Twelve regular monthly meetings have been held during the year, at which papers were read by members of the Society, several of them containing original information. These papers, with the names of the gentlemen who read them, have been already referred to in the summary of proceedings of meetings.

Arrangements have also been made within the past year to have the rooms of the Society open to members and their friends, and teachers in the public schools, on the evening of the third Tuesday in each month, and on these occasions informal addresses upon elementary scientific subjects will be delivered.

In March the Society held a Conversazione in the Museum, Library, etc., of the Mechanics' Institute. It was well attended, and was successful in every respect.

A field meeting was also held at Torryburn on the afternoon of June 25th. The results of the scientific work done on that occasion were laid before the Society at the regular July meeting.

In May last the City Corporation kindly placed at the disposal of the Society rooms on the third floor of the Market Building. One of these rooms is now used for the meetings; another is occupied as a work-room; and it has been determined during the ensuing year to fit up a third with cases for the preservation and display of the interesting collection of native birds which, through the indefatigable labors of Mr. CHAMBERLAIN and other members of the Ornithological Committee of this Society, has been added to the Museum during the past summer. The cost of these cases is estimated at nearly four hundred dollars; and an appeal will be made to the friends of the Society and the public for aid in carrying out this object. Your Council has much pleasure in stating that already several of the leading citizens of Saint John have made handsome contributions to the Society.

The Treasurer reports that the expenditure has been within the income during the past year, notwithstanding the fact that extra expenses had to be incurred in fitting up the rooms, etc.

The Librarian reports the purchase of an additional book-case during the year, and the receipt of a number of books, pamphlets, maps, charts, etc., donated to the Society, as well as several acquired by purchase. These will be found catalogued elsewhere in this Report.

The Corresponding Secretary reports that to several of the corresponding members the Society is indebted for contributions, viz: to Dr. G. M. DUNCAN, of Bathurst, for an interesting paper on "Some Medicinal Plants of New Brunswick," referred to in another place in this report; to S. W. HATHEWAY, Esq., of Boston, for a paper on "The Chemical Effects of Alcohol;" to HENRY WILMOT, Esq., of Fredericton, for a set of maps and the Report of Progress of the Geological Survey of Canada, 1878–79, and to Mr. JAMES VROOM, of Saint Stephen, for important and valuable assistance rendered to the Botanical Committee in preparing the list of plants appended hereto. The Council take this opportunity of expressing a wish that other corresponding members would furnish the Society with papers and contributions from time to time; as many of them, from their knowledge of the natural resources of the Province, are in a position to collect facts of great interest and value.

REPORT OF THE CURATORS.

THE Curators do not feel able to present a full and connected report on the condition of the Museum, owing to the fact that most of the collections have been packed up in order that the cases in which the minerals, etc., were contained might be temporarily used to protect the birds until others better adapted for them could be procured.

Since the last annual meeting most of the collections have been removed from the Museum of the Mechanics' Institute to the rooms now occupied by the Society in the Market Building. Among these are the minerals, most of the fossils, the radiates and the birds. There still remain at the Institute the other vertebrate and invertebrate animals, some fossils, and the archæological collections. All the cases have been removed from the Institute except the large centre case.

Numerous additions have been made to the Museum in several of its departments during the past year. The largest contribution is from the Ornithological Committee, the members of which have worked with great zeal during the past summer, and have added to the collection about one hundred and fifty mounted specimens of native birds.

Another valuable gift is that of Messrs. HAY and CHALMERS. This consists of about four hundred species of the native plants of the Province, mounted and labelled. Most of the flowering plants of New Brunswick are therefore now in the collection, and are available to members of the Society for study and comparison. A large number of minerals have also been added, among which the donation of JOHN KERR, Esq., of ores from the Rocky Mountains, is worthy of special mention. Mrs. HEUSTIS has taken charge of and mounted a number of insects presented by various friends and members of the Society.

The Curators call attention to the urgent need which exists for cases to contain, protect, and exhibit the collection of birds already referred to, now one of the most valuable and useful portions of the Museum, and would respectfully urge upon the Society the necessity of fostering and encouraging the work so well begun in this department by providing a set of cases that will not only meet the present demand, but will, to some extent, anticipate future additions to the collection. To the general public a well arranged collection of mounted birds is one of the most attractive parts of a Museum, and if it is intended that these birds should be made useful to the citizens by throwing open the rooms at certain times and exhibiting them, suitable cases to contain them are absolutely required.

Signed for the Curators, and
Respectfully submitted,
G. ERNEST FAIRWEATHER,
Recording Secretary.

DONATIONS TO THE MUSEUM,

FOR THE YEAR ENDING JAN. 17, 1882.

DONORS' NAMES.	DONATIONS.
The Committee on Ornithology per Mr. CHAMBERLAIN,	146 specimens of Native Birds of New Brunswick, mounted.
E. O. DAMON, Esq., Northampton, Mass.,	1 rough-legged Hawk (black phase). 2 Sparrow Hawks (male and female), all mounted.
Mr. J. H. CARNELL,	5 specimens of Native Birds, mounted.
Mr. J. MORRISON,	1 chestnut-sided Warbler, mounted; 2 Cedar Birds.
Mrs. W. W. TURNBULL,	1 short-eared Owl, mounted.
Mr. W. N. GOULD,	7 specimens of Native Birds, mounted.
W. H. PURDY, Esq.,	1 Bald Eagle (young).
Mr. R. ROWE,	2 Herring Gulls.
Mr. J. HAMMOND,	2 three-toed Woodpeckers.
Mr. G. DEVEBER, Gagetown,	2 Hudsonian Godwits.
Mr. HERBERT W. HARRISON,	1 Scaup Duck; 1 Horned Grebe.
E. C. SUTTON, Esq.,	1 Goshawk. (The unmounted Birds were mounted by members of the Committee on Ornithology).
Mr. KILGOUR SHIVES,	Bituminous Coal, stigmaria and red and grey ochres from Dunsinane, K. C.
Dr. A. C. SMITH, Newcastle,	Fossil Fern (Pecopteris) from coal measures, Clifton, Gloucester County; and Calamites and Dadoxylon from Newcastle, Miramichi.

DONATIONS TO THE MUSEUM—(*Continued*).

Donors' Names.	Donations.
John Kerr, Esq.,	Ores, minerals, and fossils from Utah.
Mr. Robert Chalmers,	Ores of silver and galena, from Nigadoo and Gloucester silver mines, Gloucester County.
Dr. L. C. Allison,	Sand dollars (Clypeaster), and a fossil fern (Pecopteris); also specimens of barnacles and worm-eaten wood.
Mr. Thomas W. Lee, Rothesay,	Specimen of *Luna* moth.
Master W. D. Matthew,	A spotted lizard or salamander, from Dark Lake.
Mr. Albert Venning,	A moth.
Mr. W. J. Starr,	Coral growth from wooden stump from bottom of St. Thomas harbor.
Mr. G. F. Matthew,	Fresh-water Pulmonates from Torryburn Lake.
Mrs. C. E. Heustis,	Snails (*succinea*) and a lizard; A number of insects such as are now ravaging the pine forests of Canada; A specimen of the apple-tree borer.
Prof. L. W. Bailey, Fredericton,	A specimen of the Basket-Fish, from Friar's Road, Eastport.
Mr. G. U. Hay,	Specimen of the Sundew (*Drosera*).
Mrs. G. A. Hamilton,	Liverwort from Portland.
Mr. A. I. Trueman,	Collection of dried plants from Westmorland County.

DONATIONS TO THE LIBRARY.

Donors' Names.	Donations.
Natural History Society of Montreal,	Canadian Naturalist for the year.
Dr. **LeB. Botsford,**	Maps of the Geological Survey of Canada for N. B., 1878–79.
Essex Institute, Salem, Mass.,	Bulletin, Vol. 12, Nos. 7, 8 and 9. " Vol. 13, Nos. 1–6.
Editors,	Maine Mining Journal.
Essex Institute,	Visitors' Guide to Salem.
Henry Wilmot, Esq., Fredericton,	Report, 1878–79, and Maps of Geological Survey of Canada.
Mr. **John Hammond,**	Reports of the second Geological Survey of Pennsylvania, as follows:— CCC. Lancaster County and Atlas. GG. Lycoming and Sullivan Counties, with Maps. GGG. Potter County, with Maps and Sections. III. Oil Regions, with Maps and Charts. R. McKean County, with Maps and Charts. T. Blair and adjoining Counties, with Maps.
Mr. G. F. **Matthew,**	Proceedings of the Society Malacologique de Belgique for Feb'y, March, April, and May, 1881.

REPORT OF THE COMMITTEE ON BOTANY.

THE Committee on Botany report that they have been engaged during the past week in determining plants which have been collected in several sections of the Province during the past two seasons of 1880 and 1881. They have found their labors comparatively easy, having been guided greatly by the valuable lists published in 1879 and early in 1880 by Prof. JAS. FOWLER. In addition to the plants named in these lists they find that about FORTY species new to the Province have been detected, and that many plants which were supposed to be rare, or limited to certain localities, are more widely distributed and occur in different sections of New Brunswick. In the list appended hereto the names of these species and details regarding the distribution of some of the rarer forms will be given, and other facts will be brought out, showing that in several districts the botany of our country is now being attentively studied by the increasing numbers of amateurs and others interested in the subject.

But while viewing with much satisfaction the progress made in arriving at a knowledge of our Flora during the past few years, which is largely due to the zeal and untiring labors of Prof. FOWLER, and the enthusiasm he awoke in a few others, your Committee would recall the fact that the botany of the Province, taken as a whole, is yet far from being known. No section of it, indeed, has been systematically studied, except, perhaps, the County of Kent, where Mr. FOWLER resided for many years. The ambitious and enterprising student will therefore find here, for many years to come, a most inviting field for his investigations. Besides the County of Kent, the only districts which have been at all examined botanically are: portions of York County in the vicinity of Fredericton and Keswick, by Prof. BAILEY, Prof. FOWLER, and others; Saint John County by Messrs. G. F. and R. MATTHEW, Prof. FOWLER, and Mr. G. U. HAY; certain parts of Charlotte County by Mr. JAS. VROOM; and of Restigouche and Gloucester

Counties by Prof. FOWLER and Mr. R. CHALMERS. The Flora of the central and western portion of the Province is comparatively unknown, having scarcely been looked upon yet by the eye of the botanist.

The contributions and donations to this Society having reference to our Flora, so far as we can ascertain, are as follows: A list of the Plants of New Brunswick, collected previous to 1864, and read before the Society on 8th April of that year, by Mr. R. MATTHEW; an original and interesting paper by Mr. G. F. MATTHEW, "On the Occurrence of Arctic and Western Plants in Continental Acadia in 1869;" and during the past year a valuable Herbarium added to the Museum by Mr. G. U. HAY. This Herbarium consists of over three hundred and fifty species of our phœnogamous plants, besides specimens of nearly all our grasses, sedges, and ferns, the whole mounted and labelled. To these Mr. CHALMERS adds a considerable number of plants, representatives of the Flora of the northern section of the Province. Mr. JAMES VROOM has recently sent in a collection from Charlotte County, some of them rare and valuable; Mr. J. MOSER, specimens from York County; and Mr. ARTHUR I. TRUEMAN a number of plants collected chiefly in Westmorland County; so that our Herbarium now represents a Flora of nearly six hundred species.

The thanks of the Committee are due to Mr. J. MOSER, of Nashwaak; Mr. J. BRITTAIN, of Petitcodiac; Mr. A. I. TRUEMAN, of St. John; Mr. G. H. BURNETT, of Keswick, and other gentlemen, for specimens collected in their neighborhood.

In the following catalogue of plants we have used the numbers in Prof. FOWLER'S lists.

GEO. U. HAY,
ROBERT CHALMERS,
JAS. VROOM,
Committee on Botany of Nat. Hist. Society of N. B.

ST. JOHN, *January 17th*, 1882.

LIST OF PLANTS.

a. **Clematis verticillaris,** *D. C.* Found at Saint Stephen by J. Vroom, and at Nashwaaksis by J. Moser, 1881.

7. **Thalictrum dioicum,** *L.* Grand Lake, G. U. Hay; Fredericton and Nashwaaksis, J. Vroom.

21 *a*. ACONITUM NAPELLUS, *L.* In an old garden at Fredericton, Vroom.

24.* **Caulophyllum thalictroides,** *Michx.* PAPPOOSE-ROOT. Found at Nashwaaksis by J. Moser, 1881.

24 *a*. **Brasenia peltata,** *Pursh.* Near Cox's Point, Grand Lake, Hay; at Saint Stephen and Fredericton, Vroom.

31 *a*. **Adlumia cirrhosa,** *Raf.* CLIMBING FUMITORY. A sport in gardens at Saint Stephen, Vroom.

45 *a*. **Draba incana,** *L.* WHITLOW-GRASS. Nashwaaksis, collected by J. Moser, 1881; said to have been found at Bathurst in June, 1881, by Mr. Chas. Lindon, of Buffalo, New York.

53 *a*. **Viola canina**, *L.*, var. **sylvestris,** *Regel.* Bathurst, 1881, R. Chalmers. Abundant near Saint John, Saint Stephen, and also on Grand Manan; Hay and Vroom.

57. V. TRI-COLOR, *L.* Escaped from gardens near Bathurst, Chalmers; on Ballast Wharf, Saint John, Hay.

68. SILENE INFLATA, *Smith.* Rather abundant in several sections of the Province.

71 *a*. LYCHNIS VESPERTINA, *Sibth.* EVENING LYCHNIS. Saint Stephen, Vroom.

71 *b*. L. FLOS-CUCULI, *L.* MEADOW LYCHNIS. Campbellton, Chalmers, June, 1877.

73. **Arenaria peploides,** *L.* Restigouche, Chalmers.

88 *a*. **Portulaca oleracea,** *L.* Saint Stephen, Vroom.

98. **Geranium Robertianum,** *L.* Lower Norton, collected by Arthur I. Trueman.

98 *a*. ERODIUM CICUTARIUM, *L'Her.* STORKSBILL. Ballast, Carleton, G. U. Hay.

113. **Polygala paucifolia,** *Willd.* Saint Stephen and Milltown, Vroom.

114. TRIFOLIUM ARVENSE, *L.* Lancaster, Hay.

115 *a.* T. HYBRIDUM, *L.* In clover field at Norton, Hay; Saint Stephen, Vroom.

117. T AGRARIUM, *L.* Fredericton and other places, not uncommon, Vroom.

123 *a.* MEDICAGO MACULATA *Willd.* SPOTTED MEDICK. Carleton, on ballast heaps, Hay.

131. LOTUS CORNICULATUS, *L.* Has disappeared from Fairville. Found at Ballast wharf, Saint John, Hay.

137 *a.* **Apios tuberosa,** *Mœnch.* WILD BEAN; GROUND NUT. Occurs at Keswick Ridge and along banks of Saint John River near Fredericton; found also at Saint Stephen in 1881 by J. Vroom.

161 *a.* **Rubus occidentalis,** *L.* BLACK RASPBERRY; THIMBLEBERRY. Keswick Ridge, Hay, July, 1880. Said to occur in Westmorland County.

182. **Saxifraga Virginiensis,** *Michx.* Mouth of Mactaquac, York County, Vroom, 1881.

186. **Penthorum sedoides,** *L.* Mouth of Jemseg, Hay.

194. **Circæa Lutetiana,** *L.* Keswick Ridge, Hay, 1880.

199.* **Ludwigia palustris,** *Ell.* WATER PURSLANE. Nashwaaksis. Collected by J. Moser, 1880; Saint Stephen, Vroom.

244. **Eupatorium ageratoides,** *L.* Lily Lake, Saint John, Hay, 1881.

252 *a.* **Aster æstivus,** *Ait.* var. **lætiflorus,** *Gray.* Kennebeccasis River, near Saint John, Hay, 1881.

265 *a.* **Solidago bicolor,** *L.* var. **concolor,** *Gray.* Tattagouche River, Gloucester County, Chalmers, 1880.

310 *a.* CARDUUS CRISPUS, *L.* THISTLE. West side Courtenay Bay, City of Saint John; apparently naturalized, Hay, 1881.

313 *a.* TRAGOPOGON PRATENSE, *L.* MEADOW SALSIFY. Weed in Todd's field, Saint Stephen, Vroom, 1880.

321 *a.* **Lactuca Canadensis,** *L.*, var. **integrifolia,** *Torr. and Gray.* Norton, Hay, 1880.

322 *a.* SONCHUS OLERACEUS, *L.* COMMON SOW THISTLE. Is found sometimes with S. ASPER, *Vill.*, at Saint John and Saint Andrews; Hay and Vroom.

326. **Lobelia cardinalis,** *L.* On Magaguadavic, Saint Croix, and tributaries, G. F. Matthew and Vroom.

330 *a.* **Campanula aparinoides,** *Pursh.* Saint George, Vroom, 1880; Grand Lake, Hay, 1881.

330 *b.* C. RAPUNCULOIDES, *L.* About Saint John and Saint Stephen; Hay and Vroom, 1881.

331. **Gaylussacia dumoza,** *Torr. and Gray.* Saint Stephen, Vroom, 1881.

331 *a.* **G. frondosa,** *Torr. and Gray.* BLUE TANGLE; DANGLEBERRY. Grand Lake, Hay, 1881.

337. **Vaccinium corymbosum,** *L.* Grand Lake, Hay, 1881; Saint Stephen, Vroom.

348 *a.* **Pyrola chlorantha,** *Swartz.* Lily Lake, Saint John, Hay, 1881.

352 *a.* **Monotropa Hypopitys,** *L.* Lily Lake, Saint John, Hay, 1881; collected at Petitcodiac, Westmorland County, by John Brittain, 1881.

363 *a.* ANAGALLIS ARVENSIS, *L.* Ballast, Saint John, Hay, 1881.

368 *a.* **Aphyllon uniflorum,** *Torr. and Gray.* ONE-FLOWERED CANCER-ROOT. Nashwaaksis, Professor Fowler, 1880; Petitcodiac, collected by J. Brittain, 1881.

369 *a.* **Linaria Canadensis,** *Spreng.* WILD-TOAD FLAX. Saint Stephen, Vroom, 1881.

369 *b.* L. CYMBALARIA, *Mill.* IVY LINARIA. Ballast wharf, Saint John, Hay, September, 1881.

369 *c.* L. MINOR, *Desf.* Ballast wharf, Saint John, Hay, September, 1881.

380. VERONICA AGRESTIS, *L.* Ballast wharf, Saint John, Hay, 1881.

386 *b.* **Phryma Leptostachya,** *L.* LOPSEED. Keswick Ridge, Prof. Fowler and Mr. Hay, 1880.

402 *a.* LAMIUM AMPLEXICAULE, *L.* DEAD NETTLE. Saint Andrews, Vroom, 1881.

408. **Myosotis arvensis,** *Hoffm.* Saint Andrews, Vroom, 1881.

416 *a.* DATURA STRAMONIUM, *L.* COMMON STRAMONIUM, or THORN APPLE. Weed well established at Saint Stephen and Saint Andrews, Vroom.

418 GENTIANA AMARELLA, *L.*, var. **acuta,** *Hook., f.* Keswick Ridge; collected by G. H. Burnett, 1881.

419. **G. linearis,** *Froel.* Nashwaaksis; collected by J. Moser.

420 *a.* **Limnanthemum lacunosum,** *Grisebach.* FLOATING HEART. Saint Stephen; Vroom, 1881. Abundant in a Lake near residence of G. G. King, Esq., M. P., Salmon River, Queen's County; Hay, 1881.

427. **Asarum Canadense,** *L.* Rather common about Fredericton.

461. EUPHORBIA CYPARISSIAS, *L.* Roadside Nashwaak, J. Vroom, 1881.

517. *a.* **Symplocarpus fœtidus,** *Salisb.* SKUNK CABBAGE. Found at outlet of Lake Utopia, Vroom, 1879. Mr. Matthew reports it at Milkish, King's County; and Dr. Duncan at Nigadoo River, Gloucester County.

520 *a*. **Sparganium minimum,** *Bauhin, Fries.* Campbellton, Chalmers.

539 *a*. **Orchis spectabilis,** *L.* Showy Orchis. Keswick, June, 1881; collected by Rev. Mr. McKiel.

546 *a*. **Habenaria lacera,** *R. Br.* Ragged Fringed Orchis. Collected at Petitcodiac by John Brittain, 1881.

550 *a*. **Spiranthes gracilis,** *Bigelow.* Collected by A. I. Trueman at Baie Verte, Westmorland County, 1876.

556. **Calypso borealis,** *Salisb.* Collected at Somerset Vale, Bathurst, by J. Meahan, 1881; also a fine bunch from vicinity of Indiantown, as early as 1861, by one of Prof. C. F. Hartt's pupils, and now in Herbarium of Natural History Society, Saint John.

558. **Liparis Lœselii,** *Richard.* Fredericton, Vroom, 1879; and Grand Lake, Hay, 1881.

563. **Cypripedium spectabile,** *Swartz.* Occurs in York and Carleton Counties, Vroom; Restigouche, Chalmers.

568. **Trillium erectum,** *L.* Restigouche, Chalmers.

581 *a*. **Polygonatum biflorum,** *Ell.* Smaller Solomon Seal. Saint Stephen, Vroom, 1881.

583 *a*. **Allium tricoccum,** *Ait.* Wild Leek. Petitcodiac; collected by J. Brittain, 1881.

598 *a*. **Xyris flexuosa,** *Muhl. and Chapm.*, var. **pusilla,** *Gray.* Yellow-eyed Grass. Kendrick's Lake, Saint Stephen, Vroom, 1881; collected by A. I. Trueman at Point de Bute, Westmorland County, 1876.

601 *a*. **Eleocharis Robbinsii,** *Oakes.* Kendrick's Lake, near Saint Stephen, Vroom, 1881.

719. *a*. **Triticum dasystachyum,** *Gray.* New Mills, Restigouche, Chalmers, September, 1880.

765. **Woodsia Ilvensis,** *R. Br.* Found at Keswick, Nashwaaksis, Saint Stephen, and near Green Head, Saint John.

780 *a*. **Selaginella rupestris,** *Spreng.* Collected by G. H. Burnett at Keswick, 1881.

A CATALOGUE

OF THE

BIRDS OF NEW BRUNSWICK,

WITH

BRIEF NOTES

RELATING TO

THEIR MIGRATIONS, BREEDING, RELATIVE
ABUNDANCE, ETC.

BY
MONTAGUE CHAMBERLAIN.

SAINT JOHN, NEW BRUNSWICK.
1882.

INTRODUCTION.

IT seems desirable that an Annotated Catalogue of the Birds which occur within the limits of this Province should be issued for the information of our people, as well as for the use of students who may desire to trace the geographical distribution of species, as the only complete list of New Brunswick Birds which has been previously published is one that appears in the Appendix to " Field and Forest Rambles,"* by Dr. ADAMS, a book that is but little known, and the list of Birds in it contains very meagre information, being little more than a mere recital of the names of two hundred and forty-eight species.

"A Partial Catalogue of the Birds of Grand Manan," by Mr. HAROLD HERRICK, is published in the *Bulletin of the Essex Institute*, for 1873, and contains some interesting and valuable notes on one hundred and ninety-four species.

There is a report of the Birds of an adjacent region, based on the observations of Mr. GEORGE A. BOARDMAN, published by Prof. VERRILL in the Proceedings of the Boston Society of Natural History, vol. ix., 1862, entitled, "A Catalogue of the Birds found in the vicinity of Calais, Maine, and about the Islands of the Bay of Fundy." This catalogue has been accepted by Ornithologists as an authentic record for Eastern Maine, and although, from their geographical relation, the fauna of the two regions must necessarily be somewhat similar, yet even between Calais and Saint John many interesting differences have been noted, and in a large number of cases the report for Eastern Maine will not apply to New Brunswick.

But, apart from the reasons already stated, neither Mr. BOARDMAN'S catalogue nor Dr. ADAMS' fully meet the requirements of the present day, for both are written in a system of

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*** "Field and Forest Rambles," with notes and observations on the Natural History of Eastern Canada, by A. LEITH ADAMS, M.A., M.B., F.R.S., F.G.S., Staff-Surgeon-Major; London: HENRY S. KING & Co., 1873. Dr. ADAMS was stationed in New Brunswick in 1867-8, attached to the 22nd Regiment.**

nomenclature and classification that is now obsolete, and neither contain the more recent records. This latter reason derives its importance from the fact that each year new species are being discovered, and something new found out about the habits of others; so that no report of any given area can be properly called either perfect or complete, but requires frequent revision.

An Annotated Catalogue of our Birds being desirable and necessary, the present paper is offered as a first instalment of such a work, and will be supplemented by additions and revisions as opportunity for further investigation occurs.

As yet, a systematic study of the Counties of Saint John and King's only has been made, and for this reason the Catalogue is divided in two divisions; the first embracing the result of observations made in these Counties; the second containing the names of species which have not been found within that area, but which have been observed elsewhere in the Province, and is chiefly compiled from previous records, many quotations being made from the lists already mentioned.

The notes are neither as complete nor exact as could be made, many questions being yet undetermined; but, as a whole, the Catalogue will serve as a starting point, and the unscientific reader, for whom it is especially intended, will find in it a fairly full account of the Birds of the Southern section of the Province. Of the Northern and Central Sections very little systematic investigation has been made, and I anticipate many interesting facts are awaiting discovery there; such, for instance, as the extreme Northern limit of the breeding area of some species, and the Southern limit of that of others.

While I have assumed the responsibility for the accuracy of this paper, I cannot claim that it is based solely upon my own observations, for several other members of this Society, who are interested in Ornithology, have contributed more or less information. To Mr. HAROLD GILBERT, especially, I am indebted for assistance. His notes on the Singing-Birds and Shore-Birds, the result of some ten years close and careful observation, have been particularly valuable; indeed, without them the report on these groups would have been very meagre. From Mr. JAMES W. BANKS I have received no inconsiderable aid in determining the breeding of many species, he having made the Oölogy of this locality a specialty; and from Messrs. JOHN HAMMOND, JOHN C. ALLISON, PETER CAMPBELL, FREDERICK W. DANIEL, ALFRED MORRISEY, and W. N. GOULD I have received valuable information.

I have also to thank JAMES H. CARNALL, Taxidermist, of this City, and Mr. GEORGE A. BOARDMAN, of Saint Stephen, for useful notes, and regret that an offer kindly made me by Mr. BOARDMAN to place at my service the result of his extensive observations in this Province did not reach me until the manuscript of the Catalogue was in the hands of the printer.

I will take this opportunity of expressing the thanks I owe Professor SPENCER F. BAIRD and Mr. ROBERT RIDGWAY of the Smithsonian Institution, Washington, for courteously rendered assistance in identifying unknown species, and for other favors; and I am also deeply indebted to Mr. WILLIAM BREWSTER, of Cambridge, and Mr. E. O. DAMON, of Northampton, Mass., for similar kind services; nor can I forget to make mention of the valuable information received from Mr. H. A. PURDIE, of Boston, whose friendly aid merits my best thanks.

In writing the Catalogue, I have copied the names and arrangement of the species adopted by Mr. RIDGWAY for the "NOMENCLATURE OF NORTH AMERICAN BIRDS," issued by the Smithsonian Institution in 1881. In species that have a local name differing from the common name of the " Nomenclature," I have added the local name, and placed it in quotation marks.

M. C.

Saint John, March, 1882.

BIRDS OF NEW BRUNSWICK.

SECTION A.

SPECIES WHICH OCCUR IN ST. JOHN AND KING'S COUNTIES.

FAMILY TURDIDÆ. THE THRUSHES.

1. **WILSON'S THRUSH, "TAWNY THRUSH."** (*Hylocichla fuscescens*).

This species is a summer resident, and builds its nest here. It is rarely met with in the immediate vicinity of the city of Saint John, but occurs more frequently about Hampton and at Westfield, though it is nowhere a common bird.

(THE GRAY-CHEEKED THRUSH, or "ALICE'S THRUSH," as it was formerly called, should be found here, but has as yet escaped detection, although during the last two seasons considerable search was made for it).

2. **OLIVE-BACKED THRUSH.** (*Hylocichla restulata swainsoni*).

A summer resident, breeding in abundance. It usually arrives from the south during the first week of May, and remains until the last week of September.

3. **HERMIT THRUSH, "SWAMP ROBIN."** (*Hylocichla unalascæ pallasi*).

Breeds abundantly, arriving and departing about the same time as the Olive-backed.

4. **AMERICAN ROBIN.** (*Merula migratoria*).

The most abundant of our Thrushes, building its nest in all suitable localities. The larger part of these birds are early summer residents, arriving from the south early in April; but a small number have been observed every winter, and occasionally large flocks are seen, as, for instance, in January, February, and March, 1880, when great numbers visited the gardens and suburbs of Saint John during the warmer weather, and retired to the woods when the cold increased.

5. **CATBIRD.** (*Galeoscoptes carolinensis*).

A rather rare, though irregular summer resident.

FAMILY SAXICOLIDÆ. THE STONECHATS, &C.

6. **BLUEBIRD.** *Sialia Sialis.*

Only three authentic instances of the occurrence of this species are known. Mr. HAROLD GILBERT saw one on Mount Pleasant in March, 1877. Mr. BANKS saw one near Millidgeville in June, 1879. He thinks this bird must have had a nest near, as there was food in its mouth, as if for its young. Mr. HENRY GILBERT shot one specimen at Rothesay on April 26, 1881. The species is given by Mr. BOARDMAN as a rare summer visitant near Calais.

FAMILY SYLVIIDÆ. THE SYLVIAS.

7. **RUBY-CROWNED KINGLET.** (*Regulus calendula*).

An uncommon summer resident. Mr. BANKS has taken one nest, built in a dense fir thicket, in the crotch of a limb.

8. **GOLDEN-CROWNED KINGLET.** (*Regulus satrapa*).

This is a common resident, but appears most abundant during the fall and winter months, when it is met in company with the chickadees. Breeds.

FAMILY PARIDÆ. THE CHICKADEES.

9. **BLACK-CAPPED CHICKADEE.** (*Parus atricapillus*).

This species also occurs throughout the year, and breeds abundantly.

10. **HUDSONIAN CHICKADEE. "HUDSON-BAY TIT."** (*Parus hudsonicus*).

Is met with occasionally at all seasons, and builds its nest here.

FAMILY SITTIDÆ. THE NUTHATCHES.

11. **WHITE-BELLIED NUTHATCH.** (*Sitta carolinensis*).

This species has been observed in early spring and in summer, though uncommon at all seasons; but I can learn of no instance of its occurrence in winter. It is, however, given by Mr. BOARDMAN as a resident in the vicinity of Calais.

12. **RED-BELLIED NUTHATCH.** (*Sitta canadensis*).

Usually an uncommon resident; but during the summer of 1878 it was quite abundant, building its nest in all suitable localities.

FAMILY CERTHIIDÆ. THE CREEPERS.

13. **BROWN CREEPER.** (*Certhia familiaris rufa*).

A rather rare summer resident; breeds.

FAMILY TROGLODYTIDÆ. THE WRENS.

14. **WINTER WREN.** (*Anorthura troglodytes hyemalis*).

A common summer resident; breeds.

FAMILY SYLVICOLIDÆ. THE WARBLERS.

15. **BLACK-AND-WHITE CREEPER.** (*Mniotilta varia*).

A summer resident; breeds. They are common about the suburbs of Saint John only for a few weeks after arrival from the South, and again for a few weeks on their return in the fall, spending the summer a short distance inland; though an occasional pair have been known to remain and build near the city.

16. **NASHVILLE WARBLER.** (*Helminthophaga ruficapilla*).
A common summer resident; breeds.

17. **TENNESSEE WARBLER.** (*Hilminthophaga peregrina*).
A rather common summer resident; breeds.

18. **BLUE YELLOW-BACKED WARBLER.** (*Parula americana*).
A rare summer resident. During the fall of 1880 two were taken at Indiantown; and on June 23, 1881, I collected one at Hampton. On September 30, 1881, Mr. GEORGE THOMAS found four that had been killed by flying against the lighthouse at Point Lepreaux.

19. **SUMMER YELLOW BIRD.** (*Dendrœca æstiva*).
This is an abundant summer resident, and is one of the few species of the *Sylvicolidæ* that is equally as numerous in the immediate vicinity of Saint John throughout the entire summer as during the migrations; for, although representatives of most of the other species that visit us nest in the suburbs, the great majority of these birds stay but a few weeks, gradually disappearing before the first of June, and retiring inland some twenty miles or more, perhaps to get rid of the fog and continuous humid atmosphere of the coast, and to enjoy the higher and more constant temperature, which, even at that short distance, exhibits a marked difference.

The Yellow Warblers, however, continue to make their homes with us year after year, building their nests in aggravating proximity to the suburban haunts of the egg-greedy street gamins, who each season pillage and destroy a large number of these daintily made homes.

20. **BLACK-THROATED BLUE WARBLER.** (*Dendrœca cærulescens*).
A rare summer resident. Mr. H. A. PURDIE identified the song of one at Hampton, June 20, 1881. Mr. GILBERT has collected two specimens.

21. **YELLOW-RUMP WARBLER.** (*Dendrœca coronata*).
An abundant summer resident, arriving from the south from the 5th to the 15th of May; breeds.

22. **BLACK-AND-YELLOW WARBLER. "MAGNOLIA WARBLER."** (*Dendrœca maculosa*).

An abundant summer resident, building in the suburbs of Saint John, and all suitable localities.

23. **CHESTNUT-SIDED WARBLER.** (*Dendrœca pennsylvanica*).

A rare summer resident. A specimen in the collection of the NATURAL HISTORY SOCIETY was taken by Mr. J. MORRISON, June 19, 1881, near Lily Lake. Given by Mr. BOARDMAN as common at Calais.

24. **BAY-BREASTED WARBLER.** (*Dendrœca castanea*).

An occasional summer resident. A specimen in the Natural History Museum was taken at Lily Lake, May 30, 1881, by Mr. DANIEL.

25. **BLACK-POLL WARBLER.** (*Dendrœca striata*).

Common during the spring and fall migrations; occasionally met with in the summer.

26. **BLACKBURNIAN WARBLER.** (*Dendrœca blackburniæ*).

An occasional summer resident. I collected one at Sutton on May 28, 1881.

27. **BLACK-THROATED GREEN WARBLER.** (*Dendrœca virens*).

A common summer resident, remaining near Saint John during the summer months, and breeding everywhere.

28. **YELLOW RED-POLL WARBLER.** (*Dendrœca palmarum hypochrysea*).

This is the first of the warblers to arrive in the spring, and is abundant near Saint John early in the season, but usually leaves the coast in a short time, often before the next comer of this family, the yellow-rump, puts in an appearance; though in 1877 a large number of them built their nests near this city.

29. **GOLDEN-CROWNED THRUSH. "OVEN BIRD."** (*Siurus auricapillus*).

A common summer resident; breeds.

30. **SMALL-BILLED WATER THRUSH.** (*Siurus nœvius*).

A summer resident, but not a common bird. Three heard singing at Hampton, and one taken at Taylor's Island on July first, are the only records of its occurrence my note-book for 1881 contains.

31. **MOURNING WARBLER.** (*Geothlypis philadelphia*).

This species had not been observed in this locality prior to 1880; but in June of that year, a cat attached to the establishment of the light-house keeper on Partridge Island carried several specimens to her rising family, and during the last week in May of 1881 this same feline collector again produced evidence of the occurrence of the species on the Island; but not a single example could be found there on June 8th, nor on several other days during the summer when the Island was searched for it. Mr. H. B. BAILEY informed me that he heard several individuals singing at Hampton on June 23, 1881.

32. **MARYLAND YELLOW-THROAT.** (*Geothlypis trichas*).

An abundant summer resident. Is common near Saint John throughout the season; breeds.

33. **BLACK-CAPPED YELLOW WARBLER, "WILSON'S BLACK-CAP."** (*Myiodioctes pusillus*).

An uncommon summer resident; arrives in vicinity of Saint John early in May; breeds.

34. **CANADIAN FLYCATCHING WARBLER.** (*Myiodioctes canadensis*).

An occasional summer resident. A nest with eggs, taken June, 1880, is in Mr. BANKS' collection.

35. **AMERICAN REDSTART.** (*Setophaga ruticilla*).

A summer resident; breeds abundantly everywhere.

FAMILY VIREONIDÆ. THE VIREOS, OR GREENLETS.

36. **RED-EYED VIREO.** (*Vireosylvia olivacea*).

A common summer resident in the interior, where it nests, but found in the vicinity of the coast only during the migrations.

37. **BLUE-HEADED VIREO. SOLITARY VIREO.** (*Lanivireo solitarius*).

Mr. H. A. PURDIE heard one singing at Hampton on June 21, 1881, and several other instances of its occurrence are known; and though I can give no data for these, they appear to be sufficiently authentic to warrant the species being recorded as a rare summer resident. Given by Mr. BOARDMAN as breeding at Calais, but not common.

38. **WHITE-EYED VIREO.** (*Vireo noveboracensis*).

Mr. HAROLD GILBERT shot one of this species at South Bay, on May 24, 1877.

FAMILY LANIIDÆ. THE SHRIKES.

39. **GREAT NORTHERN SHRIKE. BUTCHER-BIRD.** (*Lanius borealis*).

An uncommon fall and winter visitant.

FAMILY AMPELIDÆ. THE CHATTERERS, &c.

40. **CEDAR WAX-WING. "CEDAR BIRD." "CHERRY BIRD."** (*Ampelis cedrorum*).

A common summer resident; breeds. This species usually arrives in June and leaves early in the fall; but occasionally, when the weather has been mild, and the berries of the mountain-ash conspicuously abundant, large flocks have been seen during the early winter, and, in 1880, were observed in March. During the season of nidification they are rather wary and shy, but in the fall, when they have eaten freely of mountain-ash berries, they become stupidly reckless, and are easily noosed.

FAMILY HIRUNDINIDÆ. THE SWALLOWS.

41. **PURPLE MARTIN.** (*Progne subis*).

This species is an uncommon summer resident at Saint John, but at Hampton and Westfield is quite common. It generally appears about the first week in May, but comes earlier if the weather to the southward has been unusually warm—has been seen as early as April 15. It leaves here about the end of August. Breeds.

42. **CLIFF SWALLOW. "EAVE SWALLOW."** (*Petrochelidon lunifrons*).

An abundant summer resident in town and country—arriving and departing with the martins. Breeds.

43. **BARN SWALLOW.** (*Hirundo erythrogastra*).

An abundant summer resident; the first of the swallows to arrive, and the last to leave us, remaining sometimes as late as the first of October. Breeds.

44. **WHITE-BELLIED SWALLOW.** (*Taychycineta bicolor*).

A common summer resident. It is more abundant in the northern parts of the province, where it is known as the "singing swallow." Breeds.

45. **BANK SWALLOW. "SAND MARTIN."** (*Cotile riparia*).

A common summer resident; breeds.

FAMILY TANAGRIDÆ. THE TANAGERS.

46. **SCARLET TANAGER.** (*Pyranga rubra*).

A very rare summer resident. I saw one at Torryburn, June 20, 1879, and examined two specimens taken near Hampton in 1880.

FAMILY FRINGILLIDÆ. THE FINCHES, SPARROWS, BUNTINGS, &c.

47. **PINE GROSBEAK.** (*Pinicola enucleator*).

This species usually puts in an appearance about the first week in October, occasionally during the last half of September, and has been seen on September 1st, remaining until March. Some seasons it is abundant, and again, in others, very rare.

48. **PURPLE FINCH.** "**LINNETT.**" (*Carpodacus purpureus*).

A common summer resident; breeds.

49. **AMERICAN CROSSBILL.** (*Loxia curvirostra americana*).

A rather common resident. A pair were taken by Mr. GILBERT in July, 1879. Dr. ADAMS, in "Field and Forest Rambles," says "this species builds its nest in February and March, and departs in April."

50. **WHITE-WINGED CROSSBILL.** (*Loxia leucoptera*).

This species is common in both counties during the winter, and has been seen in May (1879), but has not been observed here in the summer months, although it is given by Mr. BOARDMAN as a resident near Calais, Maine, throughout the year. Dr. ADAMS says it builds in New Brunswick in January, and leaves the Province in April. OTTY CROOKSHANK, Esq., observed several nests back of Moosepath one February several years ago, and I have seen a nest in February with the bird setting on the eggs. This species was unusually abundant during the winter of 1879–80.

51. **MEALY REDPOLL.** (*Ægiothus canescens*).

This is one of the species that I have "heard about" only. Reports have reached me of its recent occurrence, but I am not satisfied that the identification has been unquestionable.

Mr. JOHN HAMMOND, who has always taken great interest in birds, informs me that some fifteen years ago it was frequently seen here, usually in company with *linaria*. He says he has captured several of both species and kept them in cages, where the difference of plumage was readily distinguished.

52. **COMMON REDPOLL.** (*Ægiothus linaria*).

A winter visitant; some seasons quite abundant.

53. **AMERICAN GOLDFINCH. "THISTLE BIRD."** (*Astragalinus tristis*).

An abundant summer resident; breeding in all suitable localities.

54. **PINE GOLDFINCH.** (*Chrysomitris pinus*).

This species has been observed here at all seasons of the year; occasionally so common as to be almost abundant; at other times it is rarely met. Dr. ADAMS states that it breeds in mid-winter.

55. **SNOW BUNTING. "SNOW BIRD." "WADDLIN."** (*Plectrophanes nivalis*).

An abundant winter resident, arriving about the first of September, and departing with the cold weather.

56. **IPSWICH SPARROW.** (*Passerculus princeps*).

Mr. WM. BREWSTER records taking one at Point Lepreaux April 11, 1876. (Bulletin Nuttal Orn. Club, vol. i. p. 52).

57. **SAVANNAH SPARROW.** (*Passerculus sanwichensis savanna*).

An abundant summer resident. On first arriving in the early spring it resorts to the upland fields, but as the nesting season approaches, it seeks the salt marshes and fields adjacent to the Bay of Fundy shore, where it builds.

58. **GRASS FINCH.** (*Poœcetes gramineus*).

The only known instance of the occurrence of this bird is one identified by Mr. PURDIE at Hampton, June 20, 1881.

59. **SHARP-TAILED FINCH.** (*Ammodromus caudacutus*).

Several specimens of this Finch were taken by Mr. PURDIE, Mr. DANIEL, and myself while collecting in the vicinity of Hampton in June, 1881.

60. **WHITE-CROWNED SPARROW.** (*Zonotrichia leucophrys*).

A very rare summer resident. CARNELL collected one in 1877 and one in 1878. Mr. GILBERT examined another specimen taken in April, 1878. "Occurs during migrations" at Grand Manan (HERRICK). "Not common" at Calais (BOARDMAN).

61. **WHITE-THROATED SPARROW. "OLD TOM PEABODY."** (*Zonotrichia albicollis*).

A summer resident, breeding abundantly in all suitable localities.

62. **TREE SPARROW.** (*Spizella montana*).

A somewhat irregular winter visitant; often very common, but in some seasons quite rare. Was more plentiful during winter of 1880–81 than before. Mr. GILBERT has collected it in May.

63. **CHIPPING SPARROW.** (*Spizella domestica*).

This species is a common summer resident, and breeds here.

64. **BLACK SNOWBIRD. "IVORY-BILLED BLUEBIRD."** (*Junco hyemalis*).

"Junco," as this species is familiarly styled by intimate acquaintances, is not a true "Snowbird" in this locality, for often it has left for a southern tour before the first flake of snow has fallen, and is not seen again until the strong sunshine and warm showers of early April have bared the fields of their winter dress, though this is not an invariable rule, for during some winters large numbers have been seen, generally in company with Tree Sparrows and Redpolls. "Junco" breeds here abundantly.

65. **SONG SPARROW.** (*Melospiza fasciata*).

A common summer resident; breeds. The average date of the arrival of this species is between the 7th and 15th of April, though the time of its coming, as indeed the coming of all our summer residents, varies very much, and is influenced by the condition of the season to the southward, for when the reports from Boston and Portland indicate a continued unusually high temperature, the birds are sure to come this far, even though the fields are covered deep with snow; but if, as it sometimes happens, our season is the more advanced, the fields bare, and the air soft and balmy, while to the southward the cold still lingers, the birds are late in arriving here.

We look upon this species as our first spring arrival, for though that semi-vagabond trio — Robin, Snowbird, and Crow — are generally at this time well represented, they are such an uncertain lot we are never quite sure these fellows may not have been lurking about the forests all winter living by their wits; but when we hear the sweet carol of the Song Sparrow, we know the spring-time has surely come.

We found broods of young birds flying at Hampton on June 20, 1881.

66. **SWAMP SPARROW.** (*Melospiza palustris*).

An uncommon summer resident; breeds.

67. **FOX-COLORED SPARROW.** (*Passerella iliaca.*)

This species passes through here on its way to a more northern summer resort, and again on its way south in the fall — though in this latter visit very few individuals appear, and but for a few days.

It can scarcely be called a true *spring* migrant, for usually the winter is still with us when it appears (about the first week in March), though on rare occasions it has been late in coming, and been greeted with bare fields and warm sunshine; and then, instead of the customary and simple, though contented, "tchip," with which it announces its presence, it has voiced its joy in such an exquisite melody that we have longed to have it stay.

68. **CHEWINK. TOWHEE.** (*Pipilo erythrophthalmus*).

Accidental. One shot at Irishtown on May 8, 1881, is preserved in the Museum of the Natural History Society.

69. **ROSE-BREASTED GROSBEAK.** (*Zamelodia ludoviciana*).

A very rare summer resident. Several specimens have been taken at Hampton.

70. **INDIGO BUNTING.** (*Passerina cyanea*).

There is one skin in collection of Mr. JAMES MCGIVERN, Jr., which is said to have been taken in this locality. This is the only instance of its occurrence I have heard of, although it is quite common on the western shore of Nova Scotia, and is given by Mr. BOARDMAN as a rare summer visitant near Calais.

FAMILY ICTERIDÆ. THE STARLINGS AND ORIOLES.

71. **BOBOLINK.** (*Dolichonyx oryzivorus*).

A common summer resident. Arrives about last of May, and departs the first week of September. Breeds.

72. **COWBIRD. "COW BLACKBIRD."** (*Molothrus ater*).

A rare summer resident.

73. **RED-AND-BUFF-SHOULDERED BLACKBIRD. "RED-WINGED BLACKBIRD."** (*Agelœus phœniceus*).

A common summer resident; breeds.

74. **MEADOW LARK.** (*Sturnella magna*).

A rare summer resident. I saw one at Sutton on August 15, 1881.

75. **BALTIMORE ORIOLE. "GOLDEN ROBIN."** (*Icterus galbula*).

Very rare in this locality, but said to be more common near Woodstock.

76. **RUSTY BLACKBIRD.** (*Scolecophagus ferrugineus*).

An irregular summer resident. Arrives about last of April. Said to breed near Garnett's Brook.

77. **PURPLE GRACKLE. "CROW BLACKBIRD."** (*Quiscalus purpureus*).

An abundant summer resident, building its nest on trees and in barns in retired situations on the marshes. Leaves here usually about the middle of September. I saw one at Loch Lomond on October 23, 1881.

78. **BRONZED GRACKLE.** (*Quiscalus purpureus æneus*).

A common summer resident; always found in company with the Purple Grackle. Breeds.

FAMILY CORVIDÆ. THE CROWS, JAYS, &C.

79. **AMERICAN RAVEN.** (*Corvus corax carnivorus*).

This species was, a few years ago, not uncommon, but is now rarely seen. Nests have been discovered at Saint Martins, Dipper Harbor, and Black Point.

80. **COMMON CROW.** (*Corvus frugivorus*).

An abundant summer resident, usually breeding in communities. During every winter a few are seen, and some seasons large flocks remain. A favorite winter haunt is Courtenay Bay when the tide has left the sand flats bare.

A race of Crows that feed only on fish and gleanings of the sea visit Mace's Bay every spring, arriving about the first of February with the schools of herring, and remaining until the middle of April. It often flies in company with the Gulls, and, like them, dips to the surface of the water, but has never been observed to dive under it. During the evening it frequents the shores of the creeks and streams in search of shell fish, and is most active at this hour and in the early morning, but during mid-day is rarely seen away from the Islands. In appearance it differs little from the ordinary crow; it is somewhat smaller in size, and its beak is rather sharper; its voice, also, is of a slightly different tone. It was, however, readily recognized by some miners, who first drew attention to it, they having been familiar with it at Cape Breton, where, I understand, it is quite common, and receives a distinctive name.

The first specimens I examined were two that had been caught in a trap baited with fish and set near the shore. A number of the ordinary crows flew around the trap without being tempted, but so soon as these fish-eaters caught sight of the bait, they eagerly flew to it and were captured. I sent one to Mr. WILLIAM BREWSTER, who kindly compared it with a large series of skins at his command, and decided it to be a common crow.

81. **BLUE JAY.** (*Cyanocitta cristata*).

An abundant resident; breeds.

82. **CANADA JAY. "MOOSE BIRD." "WHISKEY JACK."** (*Perisoreus canadensis*).

An abundant resident. Dr. ADAMS states that it brings up two broods, one in mid-winter and another in spring.

FAMILY ALAUDIDÆ. THE LARKS.

83. **SHORE LARK.** (*Eremophila alpestris*).

A winter visitant. Some few years ago it was quite abundant, but lately has been rather uncommon.

FAMILY TYRANNIDÆ. THE TYRANT FLYCATCHERS.

84. **KINGBIRD. BEE MARTIN.** (*Tyrannus carolinensis*).

An abundant summer resident; breeds.

85. **PHŒBE BIRD. PEWEE.** (*Sayornis fuscus*).

A common summer resident.

86. **OLIVE-SIDED FLYCATCHER.** (*Contopus borealis*).
A common summer resident; breeds.

87. **WOOD PEWEE.** (*Contopus virens*).
A common summer resident; breeds.

88. **YELLOW-BELLIED FLYCATCHER.** (*Empidonax flaviventris*).
A common summer resident; breeds.

89. **TRAILL'S FLYCATCHER.** (*Empidonax pusillus trailli*).
An uncommon summer resident; breeds.

90. **LEAST FLYCATCHER. "CHEBEC."** (*Empidonax minimus*).

A rare summer resident. Mr. GILBERT has collected four in six years. We heard one at Hampton on June 20, 1881.

FAMILY TROCHILIDÆ. THE HUMMINGBIRDS.

91. **RUBY-THROATED HUMMINGBIRD.** (*Trochilus colubris*).

A common summer resident; builds its nest in gardens everywhere. Arrives early in May and leaves early in September. Is abundant at Fredericton.

FAMILY CYPSELIDÆ. THE SWIFTS.

92. **CHIMNEY SWIFT. "CHIMNEY SWALLOW."** (*Chætura pelasgica*).
A common summer resident; breeds.

FAMILY CAPRIMULGIDÆ. THE GOATSUCKERS.

93. **WHIP-POOR-WILL.** (*Caprimulgus vociferus*).

An occasional summer resident. Is never met with in the immediate vicinity of Saint John, but occurs occasionally at Westfield, and more frequently between Gagetown and Fredericton.

94. **NIGHTHAWK.** (*Chordeiles popetue*).

An abundant summer resident. Have heard of eggs being found on flat gravelled roofs in Saint John.

FAMILY PICIDÆ. THE WOODPECKERS.

95. **HAIRY WOODPECKER.** *Picus villosus.*

This bird is an abundant resident, remaining throughout the year and breeding here.

96. **DOWNY WOODPECKER.** (*Picus pubescens*).

Abundant throughout the entire year; breeds.

97. **BLACK-BACKED THREE-TOED WOODPECKER.** (*Picoides arcticus*).

Resides throughout the year, but is uncommon.

98. **BANDED-BACKED THREE-TOED WOODPECKER.** (*Picoides tridactylus americanus*).

An occasional winter visitant.

99. **YELLOW-BELLIED WOODPECKER.** (*Sphyrapicus varius*).

An occasional summer resident; breeds.

100. **PILATED WOODPECKER. LOGCOCK.** (*Hylotomus pileatus*).

This species has not been taken in Saint John County, and it seldom occurs in King's; but it is common in the interior of the Province throughout the year.

101. **RED-HEADED WOODPECKER.** (*Melanerpes erythrocephalus*).

Neither Mr. GILBERT nor I have ever met this bird; but Mr. CARNELL says he shot three near Garnett's on May 24th, 1873; and Mr. BANKS reports seeing a pair in the same vicinity on May 24, 1879.

102. **YELLOW-SHAFTED FLICKER. "GOLDEN-WINGED WOODPECKER."** (*Colaptes auratus*).

An abundant summer resident; breeds. In 1879 Mr. GILBERT saw one at Mount Pleasant on December 4, and three following days, feeding on berries of the mountain ash.

FAMILY ALCEDINIDÆ. THE KINGFISHERS.

103. **BELTED KINGFISHER.** (*Ceryle alcyon*).

An abundant summer resident; breeds.

FAMILY CUCULIDÆ. THE CUCKOOS.

104. **YELLOW-BILLED CUCKOO.** (*Coccyzus americanus*).

A rare summer resident.

105. **BLACK-BILLED CUCKOO.** (*Coccyzus erythrophthalmus*).

This bird is never seen or heard near Saint John; but a short distance inland it is a not uncommon summer resident, and at Hampton is sometimes abundant.

FAMILY STRIGIDÆ. THE OWLS.

106. **AMERICAN LONG-EARED OWL.** (*Asio americanus*).

An occasional summer resident. A specimen in the Museum of the Natural History Society was taken in April, 1878. Given by HERRICK as "rather common" at Grand Manan.

107. **SHORT-EARED OWL.** (*Asio accipitrinus*).

I can learn of but three instances of the occurrence of this species in this locality—one in 1880 and two in 1881. The two last mentioned specimens are in the collection of the Natural History Society. One of them shows the "ochraceus" and "blackish-brown" coloring, described in the books, but the other has a faded appearance, and is of a dirty-white and blackish-ash plumage.

"Not very common" at Calais (BOARDMAN).

108. **BARRED OWL.** (*Strix nebulosa*).

An abundant resident; breeds. The common owl of our forest.

109. **RICHARDSON'S OWL. SPARROW OWL.** (*Nyctale tengmalmi richardsoni*).

A few specimens of this bird have been taken here. Of these that I have examined one was shot at Garnett's Creek in August, 1880, another was secured at the same place on December 31, 1881, and two were brought into CARNELL'S store by a farmer on February 17, 1882.

110. **SAW-WHET OWL.** (*Nyctale acadica*).

Resides throughout the year, but is more common during the winter months than in summer.

111. **LITTLE SCREECH OWL. "MOTTLED OWL."** (*Scops asio*).

Mr. CARNELL has seen two or three skins of this species in the collection of the late Col. OTTY, of Hampton, that were said to have been taken in New Brunswick. Mr. J. MORRISON has a specimen taken at Black River.

Given by HERRICK as common, and breeding at Grand Manan.

112. **GREAT HORNED OWL.** (*Bubo virginianus*).

Reside throughout the year; are usually most abundant during the fall and winter.

113. **SNOWY OWL.** (*Nyctea scandiaca*).

A winter visitant; usually of uncommon occurrence, but occasionally more plentiful. During the winter of 1875-6 were abundant near Saint John. CARNELL shot one at Musquash on August 31, 1880, and several persons residing near that locality told him the owl had been observed continually in the vicinity of one piece of marsh land for four or five years. Mr. VANWART, of Jemseg, also reports one spending the summer near his farm.

114. **AMERICAN HAWK OWL.** (*Surnia funerea*).

This is a rare bird with us, but I have examined several specimens taken in the Province. A skin in the collection of the Natural History Society was taken at Grand Lake November 7, 1881. One was taken at Black River in July, another at Fredericton Junction in August, and another at Garnett's in December.

FAMILY FALCONIDÆ. THE DIURNAL BIRDS OF PREY.

115. **WHITE GYRFALCON.** (*Hierofalco gyrfalco candicans*).

Several reports have reached me of "White Hawks" having been observed in various parts of the Province during the winter season, and Mr. BANKS informs me he is certain he has seen two examples, one at Millidgeville and another near Sandy Point; and knowing that this Falcon should be found here, I have placed its name in the list on the strength of these reports. It is given by Dr. ADAMS as an accidental visitant to the Province.

116. **AMERICAN PEREGRINE FALCON. DUCK HAWK.** (*Falco peregrinus nævius*).

This is probably a resident, though a very rare bird. Said to breed on cliffs on the Bay of Fundy shore, near Saint Martins.

117. **PIGEON HAWK.** (*Æsalon columbarius*).

A probable resident, although it has rarely been taken in winter. It breeds here.

118. **SPARROW HAWK.** (*Tinnunculus sparverius*).

A common summer resident; breeds.

119. **AMERICAN OSPREY. FISH HAWK.** (*Pandion haliaetus carolinensis*).

A summer resident, abundant in all parts of the Province; breeds. It frequently arrives before the ice is out of the rivers.

120. **MARSH HAWK. "MARSH HARRIER."** (*Circus hudsonius*).

A summer resident, and breeds. It is quite common in immature plumage, but I know of but one adult bird being taken here.

121. **COOPER'S HAWK.** (*Accipiter cooperi*).

An uncommon summer resident; breeds. Rare in adult plumage.

122. **SHARP-SHINNED HAWK.** (*Accipiter fuscus*).

A summer resident; breeds. This is the commonest of our Hawks; but few are observed in adult plumage.

123. **AMERICAN GOSHAWK.** (*Astur atricapillus*).

Resides throughout the year, and breeds. The young birds are common, but adult specimens are uncommon.

124. **RED-TAILED HAWK.** (*Buteo borealis*).

An uncommon summer resident; breeds. Dr. ADAMS reports it being very common in the interior.

125. **RED-SHOULDERED HAWK.** (*Buteo lineatus*).

Probably a resident, but is very rare near Saint John, though reported more common in the interior.

126. **BROAD-WINGED HAWK.** (*Buteo pennsylvanicus*).

A rather rare summer resident; breeds. Dr. ADAMS states that this and the Red-tailed Hawk (*Buteo borealis*), are the most abundant Hawks in the interior of the Province.

127. **AMERICAN ROUGH-LEGGED HAWK. "BLACK HAWK."** (*Archibuteo lagopus sancti-johannis*).

A rare winter visitant, arriving early in the fall. Given by HERRICK as "common" at Grand Manan.

128. **GOLDEN EAGLE.** (*Aquilla chrysaetus canadensis*).

There is one specimen in the Museum of the Mechanics' Institute, said to have been taken in this Province.

129. **BALD EAGLE. GRAY EAGLE.** (*Haliæetus leucocephalus*).

This species resides here throughout the year, and is abundant, but retires from the coast during the winter. Its nest has been observed at Lepreaux and Red Head.

FAMILY COLUMBIDÆ. THE PIGEONS.

130. **PASSENGER PIGEON. "WILD PIGEON."** (*Eetopistes migratoria*).

Some twenty years ago this species visited the Province during the summer in great abundance, but it is now rarely seen, a few only being observed each year on heaths where blueberries and cranberries are plentiful.

131. **MOURNING DOVE.** (*Zenaidura carolinensis*).

Three of this species have been taken; one at Hampton in June, 1880, another shot by Mr. HENRY GILBERT at Rothesay, on October 17, 1881, and a third, now in the collection of the Natural History Society, shot at Milkish, September 30, 1881.

FAMILY TETRAONIDÆ. THE GROUSE, &C.

132. **CANADA GROUSE. SPRUCE PARTRIDGE.** (*Canace canadensis*).

A resident; breeds. Rather rare near Saint John, but quite common in the interior, and more abundant in the northern section of the Province.

133. **RUFFED GROUSE. "BIRCH PARTRIDGE."** (*Bonasa umbellus*).

A resident, breeding abundantly in all suitable localities. There is considerable variation in the plumage of the Ruffed Grouse taken in this Province, for while many are referable to the typical *umbellus*, called by Dr. COUES the Brown Ruffed Grouse, a large number are of much paler color, resembling the descriptions given of *umbelloides*, the Gray Ruffed Grouse of the Rocky Mountains; and between these extremes of color are several intermediate phases. There is also a difference in the markings of these birds. A large percentage of the darker race have a continuous subterminal black band on the tail-feathers, and spots on the chin and throat; and about the same average of the lighter race have immaculate chin and throat, and lack the black band on the two central feathers of the tail. But neither rule is invariable, for of a very large number of specimens examined in the Saint John market during several seasons, numerous examples were found of all possible combinations of these points of difference. I have not had an opportunity to compare specimens of the lighter colored birds with types of the Rocky Mountain race, but think it not improbable that both the Brown and Gray varieties are represented here, with numerous hybrids.

FAMILY ARDEIDÆ. THE HERONS.

134. **GREAT BLUE HERON. "CRANE."** (*Ardea herodias*).

A summer resident; abundant in all parts of the Province. Breeds.

135. **GREEN HERON.** (*Butorides virescens*).

A summer resident; rare in these Counties, but met with more frequently farther north.

136. **BLACK-CROWNED NIGHT HERON.** (*Nyctiardea grisea nœvia*).

A summer resident. Only a few have been observed near Saint John. It is reported abundant near Bathurst and at River Charlo.

137. **AMERICAN BITTERN. "STAKE DRIVER."** (*Botaurus lentiginosus*).

An abundant summer resident; breeds.

138. **LEAST BITTERN.** (*Ardetta exilis*).

A rare summer resident. The only district in which this species has as yet been observed is on the Bay of Fundy shore between Black River and Mispeck, where some five individuals were secured between 1877 and 1881.

FAMILY HÆMATOPODIDÆ. THE TURNSTONES, &C.

139. **TURNSTONE.** (*Strepsilas interpres*).

This species is quite common along the Bay of Fundy shore during the autumn migrations; it is most abundant at Mace's Bay.

FAMILY CHARADRIIDÆ. THE PLOVER.

140. **BLACK-BELLIED PLOVER.** (*Squatarola helvetica*).

A common autumn visitant.

141. **AMERICAN GOLDEN PLOVER.** (*Charadrius dominicus*).

This species only occurs in the autumn on the way south, staying about four weeks. It was at one time abundant on the marshes and lowlands along the Saint John River, but is rarely seen there now, though it is still common about the shores of the Bay of Fundy.

142. **SEMIPALMATED PLOVER. "RINGNECK."** (*Ægialites semipalmatus*).

An abundant autumn visitant. It puts in an appearance about the first week of August, is most numerous about the first of September, and gradually disappears, all leaving by the middle of October.

FAMILY SCOLOPACIDÆ. THE SNIPE, &C.

143. **AMERICAN WOODCOCK.** (*Philohela minor*).

An abundant summer resident; breeds.

144. **WILSON'S SNIPE. "ENGLISH SNIPE."** (*Gallinago media wilsoni*).

A spring and autumn visitant. Not so abundant in this locality as at Sackville.

145. **RED-BREASTED SNIPE; GRAY SNIPE.** (*Macrorhamphus griseus*).

An autumn visitant. Were more plentiful during the fall of 1881 than had been previously observed.

146. **STILT SANDPIPER.** (*Micropalama himantopus*).

The only known instance of its occurrence is of three seen by Mr. DANIEL at Courtenay Bay on September 8, 1881. He secured one, which is now in the Museum of the Natural History Society.

147. **KNOT. ROBIN SNIPE.** (*Tringa canutus*).

A rare autumn visitant. One taken September 8th, 1881, at Saint Martins, by Mr. WM. ELLIS, is in the Museum of the Natural History Society.

148. **PURPLE SANDPIPER.** (*Arquatella maritima*).

A winter visitant; abundant at Mace's Bay. HERRICK records taking one at Grand Manan, August 13.

149. **PECTORAL SANDPIPER. "JACK SNIPE."** (*Actodromas maculata*).

A common autumn visitant. Rarely appears before September.

150. **BONAPARTE'S SANDPIPER.** (*Actodromas fuscicollis*).

An occasional autumn visitant. Three were taken at Quaco on October 26, 1881, by Mr. ELLIS.

151. **LEAST SANDPIPER. "PEEP."** *Actodromas minutilla.*

A very abundant autumn visitant.

152. **RED-BACKED SANDPIPER. "DUNLIN."** (*Pelinda alpina americana*).

A rare autumn visitant. One specimen was taken by Mr. MORRISEY at Courtenay Bay September 23, 1881. Mr. ELLIS secured four at Quaco on October 26, 1881.

153. **SEMIPALMATED SANDPIPER.** (*Ereunetes pusillus*).

The most abundant of our shore birds during the fall migrations, arriving from the northern breeding ground in August, and gradually moving south, the last being observed usually about the middle of October.

154. **SANDERLING.** (*Calidris arenaria*).

A common autumn visitant; usually the last of the shore birds to leave for the south.

155. **MARBLED GODWIT.** (*Limosa fœda.*)

Very rare near Saint John; said to be common on Bay Chaleur. A specimen in Museum of the Natural History Society was taken at Mace's Bay in the fall of 1879.

156. **HUDSONIAN GODWIT.** (*Limosa Hœmastica.*)

Has been observed occasionally during spring and fall migrations. Two specimens in the Museum of the Natural History Society were taken at Gagetown on October 25th, 1881, by Mr. GABE. DEVEBER.

157. **GREATER YELLOW-LEGS. TELL-TALE.** (*Totanus melanoleucus*).

Rare in the spring, but common during fall migrations. Arrives about the first week in August, and remains until the first week in October.

158. **YELLOW-LEGS.** (*Totanus flavipes*).

Occurs during the spring migrations, but not so numerous then as in the fall, when it is common.

159. SOLITARY SANDPIPER. (*Rhyacophilus solitarius*).

A common summer resident; most numerous in the immediate vicinity of Saint John in the autumn. Mr. BANKS took a nest and eggs at Lily Lake in June, 1880.

160. SPOTTED SANDPIPER. (*Tringoides macularius*).

A common summer resident; breeds.

161. LONG-BILLED CURLEW. "SICKLE-BILLED CURLEW." (*Numenius longirostris*).

A rare autumn visitant; said to be common on the shore of the Gulf of Saint Lawrence from Point du Chene north.

162. HUDSONIAN CURLEW. (*Numenius hudsonicus*).

An uncommon autumn visitant.

163. ESQUIMAUX CURLEW. (*Numenius borealis*).

A rare autumn visitant.

FAMILY PHALAROPODIDÆ. THE PHALAROPES.

164. RED PHALAROPE. (*Phalaropus fulicarius*).

I have seen three large flocks of this species off Saint John harbour. It is not given by Mr. HERRICK in his Grand Manan list, but Mr. BOARDMAN informs me that it is not uncommon about the islands at the mouth of the bay, and that he has taken several nests.

165. NORTHERN PHALAROPE. (*Lobipes hyperboreus*).

The only occurrence of this species I can learn of in this locality is of one that was killed at Point Lepreaux light-house in September, 1881. It is now in the possession of Mr. GEO. THOMAS, light-house keeper.

Mr. HERRICK states that "thousands may be seen all summer" near Grand Manan.

FAMILY RECURVIROSTRIDÆ. THE AVOCETS, &C.

166. **AMERICAN AVOCET.** (*Recurvirostra americana*).

A representative of this species in the collection of the Natural History Society was taken at Saint Martins in 1880 by Mr. ELLIS, who reports taking a few every season for several years. He has usually found two together.

167. **BLACK-NECKED STILT.** (*Himantopus mexicanus*).

A representative of this species in the Museum of the Natural History Society was taken at Mace's Bay by Mr. JOHN ELLIS, who reports having observed several during former years, generally in September.

FAMILY RALLIDÆ. THE RAILS, &C.

168. **VIRGINIAN RAIL.** (*Rallas virginianus*).

A common summer resident; breeds.

169. **SORA RAIL.** (*Porzana carolina*).

An uncommon summer resident.

170. **LITTLE YELLOW RAIL.** (*Porzana noveboracensis*).

A rare autumn visitant. I examined one taken at Little River, September 20, 1881.

171. **PURPLE GALLINULE.** (*Ionornis martinica*).

Accidental. In September, 1880, a female of this species was taken near Gagetown, and on April 9, 1881, a male was shot by Mr. BELYEA at Irishtown. Both skins are preserved in the Museum of the Natural History Society.

172. **FLORIDA GALLINULE.** (*Gallinula galeata*).

Accidental. Mr. HENRY KETCHUM shot a male of this species at Dick's Lake in September, 1879.

173. **AMERICAN COOT. "MUD HEN."** (*Fulica americana*).

A summer visitant. This bird had been rarely found here previously to 1876, but since then it has been increasing each year, until now it is quite common.

FAMILY ANATIDÆ. THE GEESE, DUCKS, &C.

174. **SNOW-GOOSE.** (*Chen hyperboreus*).

Some fifteen years ago several specimens of this bird were taken near Saint John, and up to that time it had been met with occasionally each season; but since then it has been extremely rare, and the only late occurrence in the Province that is known is of one taken at Gagetown in December, 1880, and now in the collection of E. O. DAMON, Esq., Northampton, Mass.

It is given by Mr. HERRICK as "rare in winter" at Grand Manan.

175. **CANADA GOOSE. "WILD GOOSE."** (*Bernicla canadensis*).

Abundant during the spring and fall migrations.

176. **BRANT.** (*Bernicla brenta*).

Abundant during the spring migrations. In the fall they generally pass over these counties without alighting, though they are abundant on the Bay Chaleur.

177. **MALLARD.** (*Anas Boscas*).

A pair of these birds presented to the Natural History Society by Dr. C. K. FISKE, were taken near Hampton by Col. OTTY some fifteen years ago. Mr. CARNELL had a male sent him, said to have been taken in this Province, and Mr. HENRY GILBERT secured a pair in August, 1880, near Rothesay.

178. **BLACK MALLARD. "BLACK DUCK."** (*Anas obscura*).

This species is abundant through the summer months; in the winter it is rather uncommon, and is then found in company with the sea ducks feeding at the mouths of the rivers and streams emptying into the Bay of Fundy.

179. **PINTAIL.** (*Dafila acuta*).

This species was not uncommon here some eight or ten years ago, but the only known recent instance of its occurrence anywhere in the Province is of a female and young brood seen on the Tobique River in September, 1879, by Mr. CARNELL.

180. **BALDPATE. "WIDGEON."** (*Mareca americana*).

Very rare. Mr. HENRY DUFFELL shot one off the "Ballast" wharf, Saint John, in January, 1880.

181. **SHOVELLER. "SPOON-BILL."** (*Spatula clypeata*).

An occasional individual has been observed on the Saint John River late in the fall.

182. **BLUE-WINGED TEAL.** (*Querquedula discors*).

A common summer resident.

183. **GREEN-WINGED TEAL.** (*Nettion carolinensis*).

A common summer resident.

184. **WOOD DUCK. SUMMER DUCK.** (*Aix sponsa*).

A rare summer resident; breeds.

185. **SCAUP DUCK. "BLACKHEAD." "BLUEBILL."** (*Fulix marila*).

Col. OTTY took one at Hampton some years ago, and Mr. McMANUS shot a male and female near the same place in the fall of 1878. A specimen in the Natural History Society's collection was taken near Gagetown by Mr. HERBERT W. HARRISON on November 10, 1881.

186. **CANVAS-BACK.** (*Æthyia vallisneria*).

Mr. CARNELL has had one specimen sent him, said to have been taken in this Province. Mr. E. C. SUTTON, who is familiar with the appearance of the bird, saw a flock in Grand Bay, on the Saint John River, several times during the fall of 1879.

187. **BARROW'S GOLDEN-EYE.** (*Clangula islandica*).

A not uncommon winter visitant.

188. **AMERICAN GOLDEN-EYE. "WHISTLER."** (*Clangula glaucium americana*).

Rather common during the fall and winter.

189. **BUTTERBALL. BUFFLEHEAD. "DIPPER."** (*Clangula albeola*).

A common resident; breeds.

190. **HARLEQUIN DUCK. "LORD AND LADY."** (*Histrionicus minutus*).

A rare spring and autumn visitant. Mr. GEO. THOMAS, of Lepreaux, has seen it in Mace's Bay in winter.

191. **LONG-TAILED DUCK. OLD SQUAW. "SOU' SOUTHERLY."** (*Heralda Glacialis*).

Common at Mace's Bay in winter, and has been taken in summer.

CARNELL has shot young birds at Westfield in August.

192. **COMMON EIDER.** (*Somateria mollissima*).

This species is a rather common winter visitant, arriving early in the fall and remaining until late in the spring.

193. **KING EIDER.** (*Somateria spectabilis*).

A rare winter visitant.

194. **AMERICAN SCOTER. "BUTTER-BILLED COOT."** (*Œdemia americana*).

An uncommon spring and autumn visitant. It arrives about March 20th, and if the weather is cold remains for two or three weeks, and halts for about the same length of time in the fall, appearing usually about the middle of September, though a few have been observed in August.

195. **AMERICAN VELVET SCOTER. "WHITE-WINGED COOT."** (*Melanetta velvetina*).

A common spring and autumn visitant.

196. **SURF DUCK. "SURF SCOTER."** (*Pelionetta perspicillata*).

A common spring and autumn visitant. Arrives about April 10th and continues northward about the middle of May. A few young birds remain at Mace's Bay all summer.

CARNELL shot two off Red Head in January, 1879.

197. **RUDDY DUCK.** (*Erismatura rubida*).

Two specimens in the brown and gray phase of plumage, said to have been taken in this Province, are in the Museum of the Natural History Society, and I have examined another killed by the telegraph wire at Lancaster Heights, September 8, 1881. These are the only instances of its occurrence known.

Given by Mr. HERRICK as uncommon at Grand Manan.

198. **AMERICAN SHELDRAKE. "GOOSANDER."** (*Mergus merganser americanus*).

A rather common resident.

199. **RED-BREASTED SHELDRAKE.** (*Mergus serrator.*)

An abundant summer resident; breeds.

200. **HOODED MERGANSER.** (*Lophodytes cucullatus*).

Occasionally seen during the spring and fall migrations.

FAMILY PELECANIDÆ. THE PELICANS.

201. **AMERICAN WHITE PELICAN.** (*Pelecanus erythrorhynchus*).

Accidental. A specimen in the Museum of the Natural History Society was shot at Point du Chene by Mr. ROBERT BUSTIN. Another is reported to have been shot near Cape Spencer in April, 1881. Mr. HERRICK records one taken at Grand Manan.

FAMILY GRACULIDÆ. THE CORMORANTS.

202. **COMMON CORMORANT. "SHAG."** (*Phalacrocorax carbo*).

A rather common resident. Breeds on islands in Mace's Bay.

203. **DOUBLE-CRESTED CORMORANT.** (*Phalacrocorax dilophus*).

A few individuals of this species have been occasionally observed about the mouth of Saint John harbour in the months of May, June, and September, but it has not been observed during any of the winter months.

FAMILY SULIDÆ. THE GANNETS.

204. **GANNET.** (*Sula bassana*).

Occasionally observed at Mace's Bay.

FAMILY LARIDÆ. THE GULLS, TERNS, &C.

205. **IVORY GULL.** (*Pagophila eburnea*).

On December 18, 1880, a Gull was shot off Saint John harbour and sent to the Smithsonian Institute, where it was identified as an immature bird of this species.

Given by Mr. HERRICK as a "winter visitant" of Grand Manan.

206. **KITTIWAKE GULL.** (*Rissa trydactyla*).

A rather common resident. Most numerous in winter.

207. **GLAUCOUS GULL. BURGOMASTER.** (*Larus glaucus*).

Rare. On December 23, 1880, one was shot from a flock of some half dozen in Saint John harbour, and sent to the Smithsonian Institute, where it was identified as an immature bird.

208. **WHITE-WINGED GULL.** (*Larus leucopterus*).

The only instance of its occurrence that is known is of a pair shot in Saint John harbour on April 2, 1881. I sent one to the Smithsonian Institute, where it was identified as an immature bird.

209. **GREAT BLACK-BACKED GULL.** (*Larus marinus.*)

An uncommon resident.

210. **HERRING GULL.** (*Larus argentatus.*)
An abundant resident; breeds.

211. **BONAPARTE'S GULL.** (*Larus philadelphiæ.*)
Uncommon. Rare in adult plumage.

212. **COMMON TERN.** "**WILSON'S TERN.**" "**SEA SWALLOW.**" (*Sterna fluviatilis*).
A common summer resident.

213. **ARCTIC TERN.** (*Sterna macrura*).
Rare. A skin in the possession of Mr. CARNELL was identified by Mr. H. A. PURDIE. A second specimen was taken off Saint John harbour in October, 1881.

FAMILY PROCELLARIIDÆ. THE PETRELS.

214. **STORMY PETREL. MOTHER CAREY'S CHICKEN.** (*Procellaria pelagica*).
The only instance known of its occurrence near Saint John is of one picked up in the garden adjoining the residence of WM. JACK, Esq., in an exhausted condition, after a severe southerly gale.

215. **WILSON'S PETREL.** (*Oceanites oceanica*).
Occasional in the vicinity of Point Lepreaux.

216. **LEACH'S PETREL.** (*Cymochorea leucorrhoa*).
Occasional in the vicinity of Point Lepreaux.

FAMILY PODICIPIDÆ. THE GREBES.

217. **AMERICAN RED-NECKED GREBE.** (*Podiceps holbölli*).
Occasional. One taken on Lily Lake, August 12, 1881, by Mr. SUTHERLAND.

218. **HORNED GREBE.** (*Dytes auritus*).
An uncommon summer visitant.

219. **THICK-BILLED GREBE.** (*Podilymbus podiceps*).

A common summer visitant; breeds.

FAMILY COLYMBIDÆ. THE LOONS.

220. **LOON.** (*Colymbus torquatus*).

Two races of Loon spend the summer in New Brunswick, and breed here. They have plumage of similar colors and markings, but one is smaller than the other, being some six inches less in length.* The larger bird is common on the lakes and rivers in all sections of the Province, seldom seeking the salt water until the rivers freeze over, while the smaller is rarely found away from the sea shore; and though only seen occasionally in the Bay of Fundy, is quite abundant on the Gulf of Saint Lawrence.

The larger race generally arrive in the vicinity of Saint John early in April, and leave after the winter has set in.

221. **RED-THROATED DIVER.** (*Colymbus septentrionalis*).

A not uncommon summer resident, though adult males with the red patch on the throat are rather rare.

FAMILY ALCIDÆ. THE AUKS.

222. **RAZOR-BILLED AUK.** (*Utamania torda*).

Occur occasionally near Point Lepreaux and Partridge Island. Given by Mr. HERRICK as common near Grand Manan.

223. **SEA DOVE. DOVEKIE.** (*Alle nigricans*).

Occasionally blown in by heavy wind from the south during the winter. Given by Mr. HERRICK as a common winter resident of Grand Manan.

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* I regret that a table of comparative measurements I had prepared was accidentally destroyed, and I am forced to write from memory of the relative size.

224. **BLACK GUILLEMOT. "SEA PIGEON."** (*Uria grylle*).
Common at Mace's Bay and Mispeck.

225. **COMMON GUILLEMOT.** (*Lomvia troile*).
Occasional. Given by Mr. HERRICK as common in winter at Grand Manan.

SECTION B.

SPECIES WHICH HAVE NOT BEEN OBSERVED IN SAINT JOHN OR KING'S COUNTIES, BUT WHICH OCCUR IN OTHER PARTS OF THE PROVINCE.

226. **STONE CHAT.** (*Saxicola œnanthe*).
One shot by GEO. MOSES on Indian Island, August 25, 1879. (G. A. BOARDMAN, Bull. Nutt. Orn. Club, vol. v., p. 115.)

227. **AMERICAN TITLARK.** (*Anthus ludovicianus*).
"Occurs in spring and fall" at Grand Manan. (HERRICK.)

228. **PROTHONOTARY WARBLER.** (*Protonotaria citrea*).
Given by Dr. ADAMS* as a rare migrant.

229. **CAPE MAY WARBLER.** (*Perissoglossa tigrina*).
"Rare; may breed" at Grand Manan. (HERRICK.) "Summer visitant. Common. Breeds," near Calais. (BOARDMAN.)

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* Dr. ADAMS states that many of the land and a greater number of the water birds in his list are given on the authority of Mr. BOARDMAN. ("Field and Forest Rambles," pp. 296, 297.)

230. **PINE-CREEPING WARBLER.** (*Dendrœca pinus*).

Given by Dr. ADAMS.

231. **WARBLING VIREO.** (*Vireosylvia gilva*).

"Not uncommon," near Calais. (BOARDMAN.)

232. **NORTHERN WAXWING.** (*Ampelus garrulus*).

Mr. BOARDMAN informs me that during some winters this species has been plentiful near Saint Stephen.

233. **LAPLAND LONGSPUR.** (*Centrophanes lapponicus*).

"Occurs in winter," at Grand Manan. (HERRICK.)

Mr. BOARDMAN informs me that he has occasionally seen examples of this species with flocks of Snow Buntings.

234. **YELLOW-WINGED SPARROW.** (*Coturniculus passerinus*).

Given by Dr. ADAMS.

235. **BLUE GROSBEAK.** (*Guiraca cœrulea*).

Mr. HERRICK records one shot at Grand Manan in the spring of 1861, by Mr. CHENEY.

Mr. BOARDMAN reports taking several in 1862.

236. **ORCHARD ORIOLE.** (*Icterus spurius*).

Mr. BOARDMAN writes me that he has taken three examples of this species.

237. **GREAT-CRESTED FLYCATCHER.** (*Myiarchus crinitus*).

Is given in Dr. ADAMS' list. Mr. H. A. PURDIE informs me he found it near Woodstock in 1878.

238. **GREAT GRAY OWL.** (*Ulula cinerea*).

"Occurs in winter" at Grand Manan. (HERRICK.)

239. **TURKEY BUZZARD.** (*Cathartes aura*).

A solitary instance of its occurrence is recorded by Mr. BOARDMAN.

240. **BLACK VULTURE. CARRION CROW.** (*Catharista atrata*).
Mr. BOARDMAN writes me that he has had some half a dozen of this species taken near Saint Stephen.

241. **AMERICAN EGRET.** (*Herodias alba egretta*).
One shot at Grand Manan, November 3, 1878. (C. J. MAYNARD, in Bull. Nutt. Orn. Club, vol. iv., p. 63.)

242. **KILLDEER.** (*Oxyechus vociferus.*)
Given by Dr. ADAMS.

243. **PIPING PLOVER.** (*Ægialites melodus*).
Given by Dr. ADAMS.

244. **CURLEW SANDPIPER.** (*Pelinda subarquata*).
Given by Dr. ADAMS.

245. **WILLET.** (*Symphemia semipalmata*).
"Rather common in August" at Grand Manan. (HERRICK.)

246. **RUFF.** (*Machetes pugnax*).
Given by Dr. ADAMS.

247. **BARTRAM'S SANDPIPER. FIELD PLOVER.** (*Bartramia longicauda*).
Given by Dr. ADAMS.

248. **GADWELL.** (*Chaulelasmus streperus*).
"Rare" at Grand Manan. (HERRICK.)

249. **LITTLE BLACKHEAD.** (*Fulix affinis*).
"Common" at Grand Manan. (HERRICK.)

250. **RING-BILLED BLACKHEAD.** (*Fulix collaris*).
Given by Dr. ADAMS.

251. **REDHEAD DUCK.** (*Æthyia americana*).
"Not uncommon" at Grand Manan. (HERRICK.)

252. **LABRADOR DUCK.** (*Camptolæmus labradorius*).

"Very rare" at Grand Manan. (HERRICK.)

253. **BLACK SKIMMER.** (*Rhynchops nigra*).

Mr. G. A. BOARDMAN saw a large flock of this species in Bay of Fundy in summer of 1879. (Oölogist, vol. v., p. 13.)

254. **RING-BILLED GULL.** (*Larus delawarensis*).

Given by Dr. ADAMS.

255. **GULL-BILLED TERN.** (*Sterna anglica*).

One shot at Grand Manan, August, 1879. (Recorded on authority of G. A. BOARDMAN, by Mr. RUTHVEN DEANE, in Bull. Nutt. Orn. Club, vol. v., p. 63.)

256. **BLACK TERN.** (*Hydrochelidon lariformis surinamensis*).

Three shot at Grand Manan, August, 1879. (Recorded on authority of G. A. BOARDMAN, by Mr. RUTHVEN DEANE, in Bull. Nutt. Orn. Club, vol. v., p. 63.)

257. **SKUA GULL.** (*Magalestris skua*).

Given by Dr. ADAMS.

258. **POMARINE JAEGER.** (*Stercorarius pomatorhinus*).

"Common in autumn on the fishing ground" near Grand Manan. (HERRICK.)

259. **RICHARSON'S JAEGER.** (*Stercorarius crepidatus*).

"Common fall visitant" at Grand Manan. (HERRICK.)

260. **LONG-TAILED JAEGER.** (*Stercorarius parasiticus*).

"Common in Bay of Fundy in August." (BOARDMAN.)

261. **FULMAR PETREL.** (*Fulmarus glacialis*).

Recorded by Mr. HERRICK as occurring near the fishing grounds off Grand Manan in autumn.

262. **GREATER SHEARWATER.** (*Puffinus major*).
Recorded by Dr. ADAMS as a winter visitant.

263. **MANX SHEARWATER.** (*Puffinus anglorum*).
Given by Dr. ADAMS.

264. **SOOTY SHEARWATER.** (*Puffinus fuliginosus*).
Given by Dr. ADAMS.

265. **BLACK-THROATED DIVER.** (*Colymbus arcticus.*)
"Occurs in winter" at Grand Manan. (HERRICK.)

266. **GREAT AUK.** (*Alca impennis*).

Mr. WYMAN, in the *American Naturalist* for 1868, expresses the belief that this (now extinct) species probably lingered on the shores of the Bay of Fundy after the advent of the first settlers.*

267. **COMMON PUFFIN.** (*Fratercula arctica*).
Given by Dr. ADAMS.

268. **LARGE-BILLED PUFFIN.** (*Fratercula arctica glacialis*).
Given by Dr. ADAMS.

269. **TUFTED PUFFIN.** (*Lunda cirrhata*).
Given by Dr. ADAMS.

---

* "Field and Forest Rambles," p. 36.

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BULLETIN
OF THE
NATURAL HISTORY SOCIETY
OF
NEW BRUNSWICK.

NO. II.

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BULLETIN
OF THE
NATURAL HISTORY SOCIETY OF NEW BRUNSWICK

NO. II.—1883.

ARTICLE I.

LACUSTRINE FORMATION OF TORRYBURN VALLEY.

BY G. F. MATTHEW, A. M., F. R. S. C.

With Dr. T. F. Allen's Notes on the Characeae.

While much attention has been given by Geologists to the deposits of the early and middle part of the Quaternary period in North-Eastern America, there is a part of this great cycle of time about which we have yet a great deal to learn, and which is of especial interest as forming the connecting link between Quaternary and Recent Time. The interest felt in this part of the geological record is enhanced by the fact that the deposits yield the earliest traces of man—for it is probably to this period that the gravels of Trenton, New Jersey, containing the rude stone implements of a primitive race belong.

The Boulder clay and Leda clay which were formed in Quaternary times have been closely investigated, and much is known of the animals which inhabited the seas and shores of North-Eastern America in the Leda clay or Champlain epoch. Even the vegetation of the land can be described in a general way with considerable accuracy, but of the succeeding Terrace epoch the biological history is very imperfectly known. The deposits of the Torryburn Valley, five miles N. E. of Saint John, supply an important link in this part of the geological chain; and the period in the Terrace epoch when this valley was elevated above the sea and occupied by fresh-water lakes, can be indicated with considerable exactness.

The time when the Torryburn deposits began may be arrived at from the following considerations:

The raised beaches and sand flats of the Terrace period in this region, which are of Quaternary age and form the connecting link with the Torryburn deposits, contain but few mementoes of the Life of those times. The "Saxicava sands" of the St. Lawrence Valley which were formed in the Terrace epoch, and were once sand flats along the sides of that valley, are characterized by the remains of the sea shells, *Saxicava rugosa (arctica), and Tellina (Macoma) groenlandica;* but in the corresponding deposit near Saint John the former of these shells is to a great extent replaced by the Common clam *(Mya arenaria)*, so that it becomes a "Mya" or "Macoma" rather than a "Saxicava sand." Such deposits of the Terrace period can be traced down to the present sea level, and there are indications that they extend many fathoms below that line. From this we infer that the sea at the close of the Terrace period had withdrawn far from the present shore line and that the latest Terrace deposits are now concealed from our view, by the return of the sea to its present level along the coast. During the time when these changes of land and sea were going on, the fresh-water deposit of the Torryburn Valley was accumulating. It may be said, therefore, that the Champlain epoch had passed away and the Terrace period was considerably advanced when the first fresh-water beds were formed in the Torryburn lakes. In this part of Canada the Champlain or Leda clay was deposited in a sea which stood about 200 feet above the present sea level; and in that part of the succeeding Terrace period when the divide of the Torryburn Valley was exposed by the rising of the land, the sea had shoaled so far as to bring the land up to within 65 feet of its present level. Two important shore lines marked by terraces, had already been raised above the water when the Torryburn lakes first appeared, and two others of equal importance mark the slopes along the sea-shore, below the level of the summit of Torryburn Valley; the 65 feet level may therefore be considered as holding a middle place in the Terrace epoch, if we suppose that epoch to begin when the higher part of the Leda clay was a-wash at the sea-level. But if the beginning of the Terrace period be reckoned from the time when the latest of the Saxicava or Macoma sands* began to be deposited on the Leda clay at the present sea level, then the first of the Torryburn fresh-water deposits must be relegated to the latter part of the Champlain epoch. It seems, however, more correct to regard the Terrace period as overlapping the Champlain, and therefore to consider the local deposits of Torryburn Valley as beginning in the middle of the Terrace period.

In the Torryburn Valley there are three depressions which were once occupied by ponds of water. Of these hollows, the southern one was shallow and was soon silted up; another, the eastern, was through the greater part of the Recent period occupied by a shallow lakelet, but finally became dry. The third or central depression of the valley was much deeper than the others; it still holds the reduced waters of a lake, which once rose to its rocky brim, and is known as LAWLOR'S LAKE.

The geology and physical history of these basins is of much interest in connection with the fresh-water deposits, and will be described in a future article, but the following observations are confined to a description of the fresh-water deposits only.

In the process of building the E. & N. A. (now the Intercolonial) Railway, a heavy rock-cutting was made at the Western end of Lawlor's Lake, and about 13 feet in depth of its waters were drawn off. By this means the beds of shell-marl which underlie the waters of the lake were exposed to view, and attracted the attention of certain members of this society. Samples of the marl containing fresh-water shells were sent to the museum of Comparative Zoology at Cambridge, and the peculiar varieties of a species of *Valvata* occurring in them, attracted the attention of Prof. Alpheus Hyatt of Boston, who visited the Lake in 1877 for the purpose of examining the marl. At his request I undertook to study the geology of the deposit, in connection with his proposed work on the biology of the mollusca which inhabit its waters and are found in the marl beds.

To investigate certain doubtful points which had come up, I found it necessary to make more careful examinations than I at first contemplated, and in the summer of 1880 and 1881, made collections of material from the base to the summit of the lacustrine deposit. These collections which exhibit the whole series of layers in the deposit, from the Saxicava or Macoma sand upward, have since been examined in a general way, and a synopsis of the results obtained, in so far as they relate to the Land vegetation, and the fresh-water plants of the order *Characeae*, are given in the following pages, together with valuable notes on the Characeæ from the pen of Dr. T. F. Allen of New York, a celebrated writer on these low forms of vegetable life.

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* *Macoma groenlandica* is a small, lenticular, bivalve mollusc about the size of the human thumb-nail, a variety of which, *Macoma fusca*, is now quite plentiful along the sandy beaches of the Bay of Fundy.

As the investigation of the deposit of the lake is not yet completed, I shall only give at present a brief outline of the physical aspect of the formation, chiefly to elucidate Dr. Allen's notes on the Characeæ.

Before my examination of the lake deposit it was not suspected that any lacustrine beds other than the marls existed there, the underlying clays being supposed to be marine; but it was found that the pure shell-marl formed relatively less than a half of the whole lacustrine deposit, where it is accessible along the present margin of the lake. Several pits were sunk through the fresh-water deposit, and the most complete series of beds observed is that given in the following section. The numbers indicate groups of beds which have a common physical aspect, and the letters a thickness in each case, with a few exceptions, of about 3 inches of the deposit.

No. 1 *a* Marine sandy clay (Saxicava or Macoma sand) with marine molluscous remains of species found in the Upper Leda-clay and Saxicava (Macoma) sand.

No. 1 *b*	Lacustrine clay,	17	inches.
No. 2 *a b c*			
No. 3 *a b*			
No. 4 *a b*			
No. 5 *a b*	Lacustrine peat,	3	"
No. 6 *a b c d*	Peaty marl,	25	"
No. 7 *a b c d e*			
No. 8 *a b c d e*	Pure marl,	36	"
No. 9 *a b c d e f g*			
		81	

The whole lacustrine deposit rests everywhere upon the Saxicava sand which owing to the sheltered position in which it was accumulated is largely mixed with clay, to this cause probably is to be attributed the presence of such species as *Balanus crenatus*, *B. Hameri* and *Mytilus edulis*, common in the Upper Leda-clay but which are also found in the marine beds immediately beneath the lacustrine clay of Lawlor's Lake. The passage from the marine to the fresh-water part of the clays, though not obvious to the eye, can be detected by a change in the specific gravity of the clay, and this will be found to be a useful method of separating the different parts of a continuous deposit, partly of salt-water and partly of fresh-water origin. At 1*b* the clay is about 1-10 lighter* than the marine clay beneath, and in the next inch No. 2*a* is reduced so as to be only two thirds of the weight of 1*a*. This change of density in the clay is due to the introduction of organic matter, chiefly low forms of vegetation which must have grown abundantly in the lake after the exclusion of the sea. The vegetable matter is mostly cellular tissue and not readily noticed except for the changed color of the clay; but its effect upon the weight of the clay can be at once seen by comparing the specific gravities, of Nos. 3 and 4, which are reddish clays like No. 1*b*, with that of the marine bed No. 1*a* which is only about a fifth heavier than these (Nos. 3 and 4.) The large addition of vegetable matter in No. 5, by which the color of the clay has been changed to olive grey, has a decided effect on the specific gravity; in the lower part of this division the weight is one quarter less than the standard of the marine clays, and in the upper part is not more than half. These weights do not express the full difference in the actual weight (less the water) of these different parts of the deposit when fresh; for in drying No. 5 lost nearly one quarter of its bulk, and No. 2 also lost in volume considerably. The shrinkage is no doubt due to the large quantity of cellular algae which these deposits contain. Such a marked difference between the weight of marine and lacustrine clays in the successive, or alternating beds of a deposit, is not to be looked for in larger basins, but I have no doubt the rule will be found to hold good to an appreciable degree in almost any fresh-water deposit formed in a basin of moderate dimensions.

Div. 5 marks an important epoch in the history of the lake, for at this period the influx of clay carried down by streams into the lake was arrested, and the molluscan fresh-water *fauna*, of which only the faintest traces can be found in the clay beds, immediately spread and occupied the waters of the lake. It is an interesting subject of inquiry as to what caused this sudden and important change in the condition of the lake and of the surrounding slopes.

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* The weights given are those of air-dried samples of the deposit coarsely pulverized.

The period during which the lacustrine clays were deposited was one of rapid and momentous change in the *fauna* and *flora* of the lake, being marked by the arrival and increase, and on the other hand by the curtailment in numbers and probably the extinction of species in quick succession. The part of the deposit above the peat, in the accumulation of which a much longer period of time was taken than was required for the clays, marks on the contrary a quiescent period and was characterized by a slow and gradual change in the *fauna* and *flora*.

One cause which may have had an important influence upon the deposits made during the period of the Lacustrine clay, was the condition of the surface of the land when Torryburn Valley emerged from the sea. The formation of terraces at various levels along the sea-coast in this region during the Saxicava period shews that the rise of the land from beneath the ocean at this time was not slow and gradual, but was effected by spasmodic movements which at once, or in a very short space of time, carried large areas of surface above the sea. Such a movement between the time of the formation of the 100 and of the 50 feet terrace would have exposed the steep hill-sides around Lawlor's Lake, at that time covered with marine clay, to the action of atmospheric agents; there was no mat of vegetation, nor covering of trees to absorb and retain moisture, and the effect of rains and spring floods in sweeping a turbid deposit into the lake can be readily understood. But the sudden cessation of this mechanical deposit at No. 5 and its subsequent entire exclusion from the lake is not so easily explained. Possibly an improvement in the climate may have been influential in promoting a more rapid growth of vegetation and in moderating the spring floods—possibly artificial dams made on the stream which enters the lake may have arrested the muddy waters in their course, and prevented them from entering the lake until deprived of the clay which they carried in suspension.

It would appear that the growth of the fresh-water plants was subject to much vicissitude during the time when clayey sediment was pouring into the lake; but as soon as this ceased, these plants immediately took full possession of the lake in advance of the arrival of the molluscan *fauna*, and even after this addition to the living forms which peopled the lake, the lacustrine vegetation formed a predominating element in the deposit made at its bottom. After the arrival of the mollusca, however, the species of plants were not all the same as those which lived in the lake before that time, but included forms better suited to the clear, calcareous waters in which the water-snails delighted. Such plants, too, as were now in the lake had a better hold of their habitat, flourished in great numbers, and the species were not replaced with the same rapidity as their predecessors had been.

OBSERVATIONS ON THE CHARACEÆ.

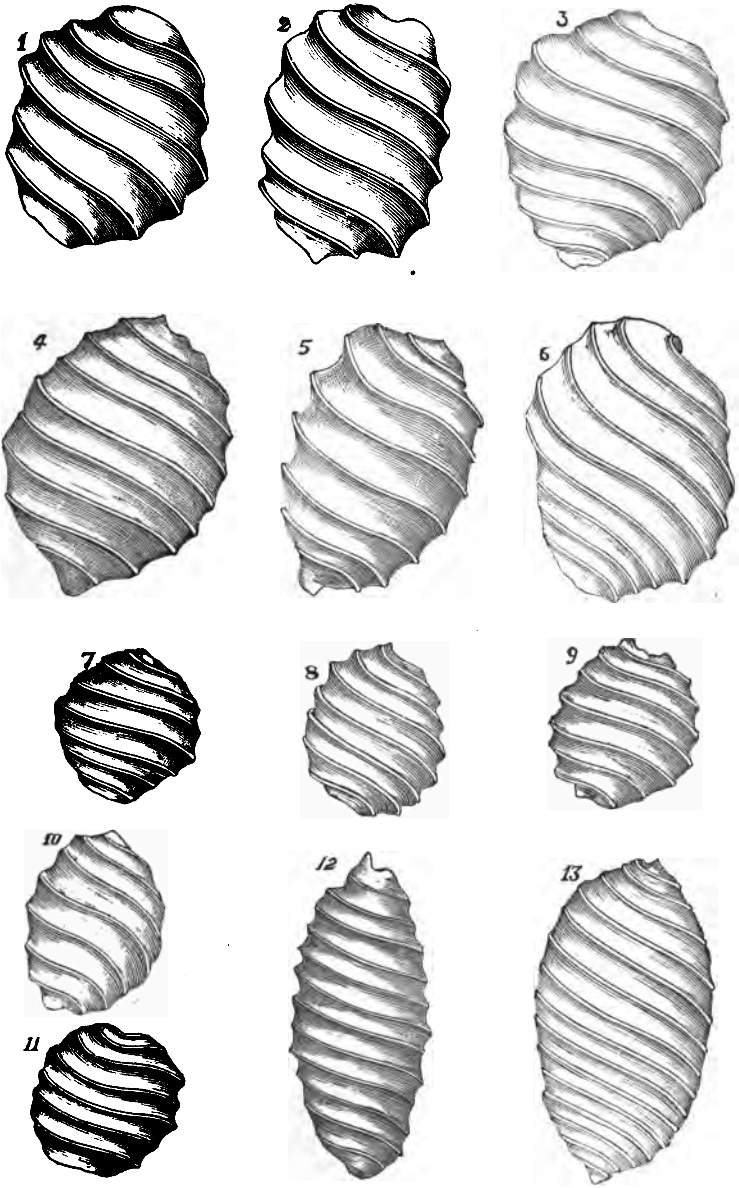
The Charæ participated in the conditions effecting other portions of the lacustrine vegetation, and their appearance in the lake at a very early period is noticable and somewhat remarkable. These plants are of a comparatively low order, and entirely aquatic in habit. They live submerged in the water, their seeds are not adapted for being wafted by the wind, and the disagreeable odour, which characterizes the living plant, would repel many animals, which are active in propagating other plants, by transporting their seeds from place to place; yet a species of this genus was one of the earliest migrants into the lake.

The permanency of Chara when it has once taken possession of a sheet of water may be inferred from the fact that different species flourish in lakes in the same neighborhood without intermixture for (historically) long periods of time—a lake having one or more species or varieties peculiar to itself. The early advent of Chara at Lawlor's Lake is therefore somewhat remarkable. It is true that some species of this genus inhabit brackish water; but the relations of Lawlor's Lake to the surrounding land show that at its emergence from the sea, the transition from salt to fresh water conditions must have been rapid, if not instantaneous.

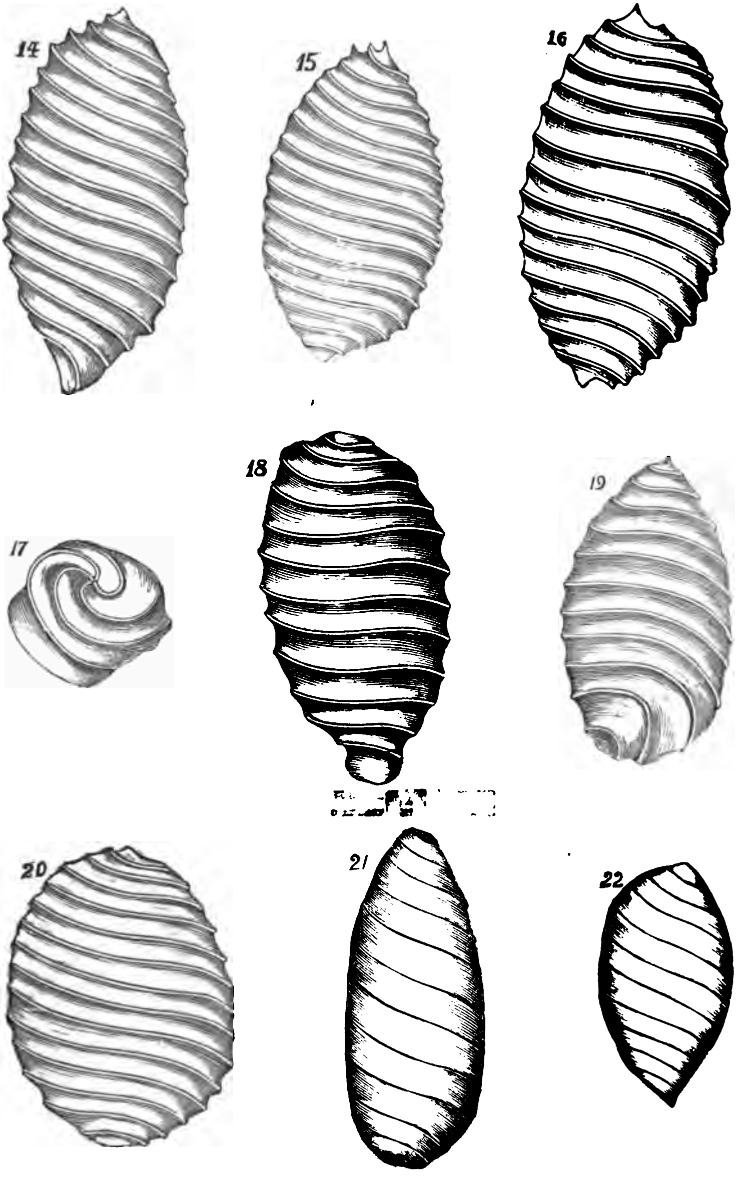
Though the stems and leaves of Chara are perishable, the small nucleus or spores, which are about the size of a minute pin-head, are hard and durable; and owing to the spiral striæ or keels (due to the impression of the spiral tubes of the sporangia or seed vessel) with which they are ornamented, are very striking objects under the microscope. In the fossil condition these seeds are generally black, with a smooth shining surface, and the keels are usually coated with shining white crystals of calcareous salts. In the washings of the marl and clay beds these minute seeds float to the sides of the vessel and may be removed in great numbers. The seeds or spores though comparatively scarce in the lower divisions of the deposit, become very numerous in Div. No. 6, and in Nos. 7, 8 and 9 they are found in enormous numbers. They appear to be most numerous in the middle portion of Nos. 7 and 8, respectively, and in the upper part of No. 9. The species are distinguished by the form and size of the spores, the number and distinctness of the striæ or keels, &c.

Dr. Allen finds the spores of one species, which he identifies with *Chara coronata*, Ziz., as low down as the lower half of No. 1*b*—the very beginning of the fresh-water clay. This species I found to increase in number in the upper part of No. 1, and the lower part of No. 2, but in the upper two thirds of No. 2, and in the lower half of No. 3, it appears to be scarce, as none were observed. It reappears in considerable numbers in No. 4 and the lower third of No. 5. This is the limit of the clayey sediment in the deposit, and I did not detect it higher up. Dr. Allen, however, found examples of what he considers the same species, "though sparingly," in the higher numbers, 6, 7, 8 and 9. The species has left its remains most abundantly in the lacustrine clay, and they are especially numerous in those parts of the clay beds which are most heavily charged with mineral matter of sedimentary origin. Its abundance in these beds would seem to indicate that the species is partial to waters containing an abundance of argillaceous sediment. In the accompanying wood cuts the first four figures, copied from drawings by Dr. Allen, represent examples of this form of nucleus, arranged from left to right as they are found at successively higher levels in the deposit: the two last figures of the second row represent irregular forms, or varieties of the same species.

Another species which Dr. Allen detected in samples from the lower part of the lacustrine deposit is of small size, nearly globular, and has from 6 to 7 keels. This nucleus was found in the lower part of 2*b* and of 3*b*; also in 4*a* and in 6*b*, &c. Its range was therefore much the same as that of the last named species. Dr.



Spores of Characeæ, Lawlor's Lake.



Spores of Characeæ, Lawlor's Lake.

Allen says that this seed may belong to a *Nitella*, perhaps *N. megacárpa* Allen, as he knows of no *Chara* with similar nuclei. The third row of figures, and the first two figures of the fourth row, represent this species as drawn by Dr. Allen, and the forms are arranged in ascending geological order from left to right, the oldest being to the left in the third row.

The great bulk of the seeds of Chara found in the deposit belong to a species which exhibits considerable diversity in the form and markings of the nucleus. I did not find any form of this type lower down than the top of No. 2*b*; but Dr. Allen has detected it in the upper part of 2*a* and the middle of 2*b*. It would, therefore, appear to be limited in the lacustrine clay, to that part which is least charged with mineral matter, and even there it is very scarce. It seems to have found difficulty in maintaining itself in a habitat where *C. coronata* flourished; but later in the history of the lake, when the clayey sediment disappeared, it became immensely abundant. The partiality of this species for clear water is very evident in its increase and prevalence in the higher part of the lake deposit. When *C. coronata* disappeared from the lower layers of the Lake Peat, No. 5, this species immediately took its place, and at the top layers of the peat its seeds had become numerous. In No. 6 the seeds are quite common, and its prevalence in the lake seems to have been accelerated rather than retarded by the spread of the Molluscan *fauna*. This form of nucleus was long-elliptical-oblong with sharp keels or striæ, generally about 12 in number, but varying from 10 to 13 in those preserved in the deposit above the Peat (No. 5), though perhaps with more numerous ribs on the spores from the Lacustrine clay (No. 2, &c.). This nucleus, according to Dr. Allen, has the character of *C. fragilis* Desv. Nos. 12 to 16 and No. 17 (end view) are the principal varieties of this form, and are arranged in ascending order from left to right; Nos. 18 and 19 are somewhat irregular forms of the same species.

Dr. Allen recognizes two other types of spores, one of which is broadly oval and with ribs less prominent than those of the *C. fragilis* form; this occurs in No. 7*c*, &c., and has the characters of *C. intermedia* A. Br., a species now living in the lake. This form is figured in the last row on the wood cut. The other type of spore referred to above is figured beside it, and is smooth, long-oval and has faint, spiral striæ or ribs. This Dr. Allen has not determined, but thinks it may be a variety of the last named species.

DR. T. F. ALLEN'S NOTES ON THE CHARACEÆ OF LAWLOR'S LAKE.

"In No. 1*b* are found the seeds of a Chara which with variations occur in most of the numbers, though sparingly in the higher numbers (7, 8 and 9). This form has seven prominent angles, varying to 6 and 8. Its length varies from 480*u* to .634*u*, and its breadth from 408 to 488*u*. The accompanying drawings magnified 50 diameters represent this form, (Figures No. 1 to 6.)

In Nos. 2*b*1, 3*b*1, 4*a* and 6*b* and *c*. is a small globular form, quite distinct; angles usually six varying to 5 and 7, prominent; length 340 to 365*u* breadth 315 to 340*u*; slightly longer than broad (Figures No. 7 to 11.)

From 2*a* up through all the numbers is found a large, variable, but definite form. The striae are numerous, from 11 to 14 in number, the angles prominent, sharp. Length 536 to 550*u*, breadth 390 to 512*u*. Quite variable in form and size, but we have found it impossible to distinguish definite characters, owing to the innumerable intermediate forms. The most pronounced forms are given in Figures 12 to 20.

There is a form found now and then, especially in No. 6, with *very faint* striae, but in other respects similar to the preceeding. This form is given in Figures 21 and 22.

The recent Chara from the adjacent pond (Lawlor's Lake) belongs to the species *Chara intermedia*, A. Br., probably to variety *Americana*, A. Br., but as it is immature (in the sample sent) the seeds cannot be inspected.

Note 1.—The first mentioned speeies belongs, doubtless, to a form or forms of *Chara coronata* Ziz. This species is exceedingly variable in size and general appearance; the seeds found in these deposits approach closely to our common form, known as variety *Schweinitzia*, but the angles are much more prominent and sharp, and its outline and general appearance differ considerably. (Figs. 1—6).

Note 2.—The small globular seeds may belong to a *Nitella;* we know of no Chara with similar nuclei. The species cannot be determined, though from the character of the nuclei we might infer their belonging to a species not uncommon in that region (North-Eastern North America), *N. megacarpa*, Allen, (Figs. 7—11).

Note 3.—The large black seeds may be classed in three groups, the long and rather narrow, with sharp angles, (Figs. 12—18), the broadly oval (Figs 19 and 20), and the oblong with very faint striae (Figs. 21 and 22). The first group has the characters of *C. fragilis*' Desv.; the second of *C. intermedia*, A. Br. (now living in the lake), and the third cannot be determined accurately; possibly it may be a form of the latter class.

Note 4.—We do not discover any progressive change of form in the nuclei from different numbers (or divisions of the lacustrine deposit), nor any characters which would lead us to suppose any of the nuclei to belong to extinct species. The first form (*C. coronata.* probably) has no *exact* counterpart among our existing species, but they are not well known."

NOTES ON THE LAND FLORA AND FAUNA.

Scattered through the various members of the lake deposit, but more particularly abundant in the Clay, are fragments of wood, bark, cones of evergreen trees, bud-scales and leaves, and fruits of several species of Land plants. Among the earliest determinable objects of this kind are the leaves of the American Fir (*Abies balsamea*): these leaves were not found plentifully, and are smaller than the average of leaves of the firs now living in the neighborhood. This species was not found so low down in the deposits of Lawlor's Lake as in those of the Eastern Basin.

The seeds of the European Cranberry (the small marsh cranberry) (*Vaccinium oxycoccus*), has a wide range through the deposits of Lawlor's Lake, but is less plentiful in those of the Eastern Basin. It was very plentiful throughout the layers of Div. 2, having first appeared in Division No. 1. Throughout Nos. 3, 4 and 5, it is also found, but above this becomes scarce. The appearance of this species among the first in the lake deposit is quite in accordance with Nature's provisions for its propagation,—namely: the tough, impervious skin of the fruit, the floating air-cells of the pulp, the hard nut-like covering of the embryo, &c.

In the Eastern Basin the remains of the Black Spruce (*Abies nigra.*) were found at a lower level than in the deposits of Lawlor's

Lake, having been observed in Div. 2, but the numerous twigs and branches of soft-wood trees buried in the Lacustrine clay at this horizon are probably in part of this species. The leaves were smaller than the average of those of living trees.

The Larch (*Larix Americana*) was also first detected in the Eastern Basin, but occurs at a higher level in the Lake deposit. In their slenderness, and the close approximation of the nodes to which the leaves were attached, the twigs resemble those of trees that grow in bogs, or wet land with a cold northern aspect.

The Sweet Gale (*Myrica Gale*), a bush with leaves that yield a balsamic odor when crushed, was plentiful around the borders of the Eastern Basin when the beds of No. 5 were deposited in the Lake.

In the Eastern Basin at the horizon of No. 6 of Lawlor's Lake deposits, cones of the White Cedar (*Thuja occidentalis*) were first observed—and the same basin at No. 7, contained remains of the Yellow Birch (*Betula lutea*),—a species of Willow and a number of species of deciduous shrubs and trees, including Birch, Alder and other kinds, still undetermined, grew around the Eastern Basin, or at Lawlor's Lake. Among species that grew in a pond in the former was the Water Lily (*Nuphar advena?*) and both sheets of water were plentifully supplied with several species of Pond Weed (*Potamogeton*).

The scarcity of the seeds of the Bog Cranberry in the bed above the Lake peat, No. 5, appears to be connected with the appearance in the Lake Basin of a grass, the seeds of which first appear in the upper part of No. 5*a*. These seeds increase rapidly in number, in passing upward through No. 6, and in 6*c* are enormously abundant. 120 seeds have been counted in a cubic inch of this part of the deposit. In 6*d* their numbers are much reduced, and throughout No. 7 they are about half as numerous as in No. 6*c*. In division 8 there is a great falling off in the abundance of these seeds and throughout No. 9 they are quite scarce. This grass must have grown in immense quantities around the shores of the lake when the peaty marl of Nos. 6 and 7 was being deposited. The appearance of this grass was synchronous with the exclusion of turbid waters from the lake, and its presence may have been connected with causes which led to a change in the mineral composition of the deposit in the lake, for about this time appeared those primeval architects of the northern streams.

THE BEAVERS.

No traces of these creatures have been observed below No. 5; but at this horizon in the Eastern Basin minute chips of wood were found, bearing marks of the teeth of a gnawing animal, and the leaves of the deposit become papery, as if macerated in water, showing that a pond had been formed in that part of the valley. More decided indications of the presence of beaver appear in No. 7, which contains fragments of branches of trees that have been gnawed by these creatures. Similar gnawed sticks were found in the deposit in Lawlor's Lake at the horizon of the Peaty marl, (Nos. 6—7,) and further indications of their work in two beaver dams at the West end of the lake. Of these dams the one at the outlet of the lake has been nearly destroyed by the operations connected with the building of the Intercolonial Railway: but the other is perfect and extends down through Nos. 9, 8, 7 and 6 of the Lake deposit. Along the lake front of this dam the two middle divisions, Nos. 7 and 8, had been compacted into a dark, grey peaty mass, full of sticks and twigs of ametiferous and coniferous trees. No. 5 also abounds with similar fragments of trees; and with seeds, glumes, spikes and culms of the grass referred to in a previous paragraph, intermingled with seeds of pond weeds; and contains also cones of Black Spruce, and fragments of the tests of insects.

At the level of Div. 6 leaves of coniferous trees and of the woodland Horse-tail (*Equisetum sylvaticum*), seeds of various plants and a cone of the Larch tree were imbedded in the deposit. Here also on the outer slope of the dam, the Molluscan fauna which had invaded the lake becomes conspicuous, the dark loam of the dam being speckled and blotched with scattered shells of water snails of the genera *Planorbis*, *Limnœa* and *Valvata*, as well as a few shells of a little bivalve called *Pisidium*.

Similar remains with the addition of a *Sphaerium* among the molluscs, and fragments of mosses, seeds of the Black Spruce, and a greater variety of the seeds of other plants than occur below are found in Div. 7. Leaves of the Sweet Gale which in the Eastern Basin occur as low down as No. 5, were here found in No. 7.

At the horizon of No. 8 the molluscs of the lake were found in the greatest abundance. They were entangled among the twigs and branches which abounded on the slope of the dam and include, beside the genera mentioned above, a water-snail of the genus *Physa.*

The remains of the molluscs bcome quite scarce in the next division (No. 9) along the face of the dam, having been driven further out into the lake by the accumulation of vegetable rubbish and debris brought in by the beavers. But though fragments of the branches of trees are quite plentiful in this part of the dam, the layers are more sandy, and the specific gravity greater than that of the underlying portions of the dam. This may have been owing either to increased floods in the streamlet which here enters the lake, or to the operations of the beavers in plastering the dam. The specific gravity here is 1.4, but in the lower layers, (No. 6) in the front slope of the dam is 1.08. In the foot and a half in depth of black loam which forms the top of the dam the specific gravity was only 0.24. This portion was apparently the part of the dam which stood out of the water, was not permeated by mud, and became the foundation for a vigorous growth of trees when the beavers were driven from the lake.

About the slopes and ends of the dam grew the grasses, sedges, horsetails and other herbaceous plants which have shed their seed so plentifully into the lake, in its front; and on the other side of the dam was a small pond fed by a little rivulet (the only one which enters Lawlor's Lake)—where, no doubt, the habitations of these intelligent creatures were built.

TRACES OF PRIMEVAL MAN.

Such was the home the beavers had made for themselves in this secluded valley, providing for their own wants and at the same time protecting the interests of their molluscan neighbors in the lake. It is to be feared, however, that their busy and peaceful home was not free from the incursions of enemies. A small fragment of *charcoal* found some distance beneath the surface in the deposits of the Southern Basin tells, probably, of the presence of *Man* in this valley, long before the advent of the English or the French Colonist,—possibly even before the arrival of the "Indian" race, whom the

European colonists found in possession of the country. The deposits of the Southern Basin did not begin to accumulate rapidly until the formation of the 50 feet terrace of the Saxicava period, and are younger than the earliest of the lacustrine beds. Their thickness is about seven feet, of which the lower four-and-a-half feet are clays and sands with occasional layers of brown peat. About six inches in depth from the top of these sandy clay beds the charcoal was found. The upper two-and-a-half feet of the deposit consists of dark brown and black peat which had accumulated after the basin ceased to be flooded with water carrying muddy sediment, and was converted into a swamp. Firs, cedars, alders and other bushes and trees helped to build up a mass or vegetable matter apparently after man came upon the scene. And the beaver continued to build during the same period in Lawlor's Lake. They were not exterminated ; we do not know that they were even much disturbed by their more powerful and dangerous rival in the art of constructing dwellings.

CLIMATE OF ACADIA DURING THE RECENT PERIOD.

At the present day the climate of this region is very much milder than it was during the Glacial or Boulder-clay period. How it became ameliorated as time went on, is an interesting subject for investigation, and has to some extent been elucidated by the writings of Dr. J. W. Dawson and others. The remains of marine animals entombed in the Post-Pliocene deposits do not so clearly show this, as do the remains of land plants, because they tell rather of the temperature of the sea and its currents, than of the warmth or dampness of the air circulating over the land, or the influence of the sun in promoting vegetable growth. By means of the plants remains of the Champlain epoch Dr. J. W. Dawson has shewn that the climate of the Ottawa valley during that period, was about as warm as the southern coast of Labrador is at the present time.

All of the plants named by Dr. Dawson as occurring in the marine clays of the Ottawa valley except the Balm of Gilead (*Populus balsamifera*) might now be found growing freely in a wild state near Saint John. There would, nevertheless, be many species of a more southern range mingled with them, showing a more genial climate, but I am inclined to think that the plants which occur in the lower part of the lacustrine beds of Lawlor's Lake may be looked upon as having a more northern *facies* than those of the upper part, or than those living in this region at the present day. There is a prevalence in the lower part of plants of High-northern distribution, as the Black Spruce, the Fir, the White Birch and the small Bog Cranberry. The Larch and the Sweet gale come in higher up in the beds and the White Cedar, the Water Lily, the Alder and other broad leaved shrubs and trees are found still later. But the apparent absence of these plants from the lower deposits is not much to be depended on as a proof that they were not growing here then; and it is to be noted that the Fir which is of a somewhat more southern range than the Black Spruce is found at the base of the deposit and must have been growing here when Lawlor's Lake first emerged from the sea.

In the stunted appearance of the plant remains found in the lacustrine clay, there would nevertheless appear to be an indication that the plants which grew upon the slopes around the lake when the salt-water left it, were not so well nourished as those which clothed its margin in later times. The leaves of both Spruce and Fir were smaller and the twigs of the Larch were slenderer, and had the projecting nodes to which the fascicles of leaves were attached, smaller and more closely approximated than in individuals living in similar situations at the present day.

BOTANY OF THE UPPER ST. JOHN.

BY G. U. HAY.

[Read before the Society, November 7th.]

In the course of two hasty visits to the upper St. John, the first in the summer of 1879, and the second during the past summer, I have been enabled to discover the whereabouts of some plants not before found in the Province, and to extend the range of a considerable number of species hitherto confined to a single locality, or which are at least comparatively rare in this country. "A page in the Botany of the Upper St. John" would perhaps be a more modest title for the present paper, as a much more extended observation of the territory chiefly explored must be made before an accurate account of its flora can be given.

I have noted in the following pages only such plants as are new and rare to the Province. The journey in each case was made in mid-summer when forest and river bank were literally teeming with vegetation. The length of each trip, the short time for its accomplishment, and its pleasures and difficulties were impediments to the slow and careful work so necessary in the examination of any particular territory. Then on the one hand the ferocious assaults of black flies and mosquitoes, the labour of striking and folding tents, and providing for material wants, made the pursuit of science one of some difficulty; while on the other, the keen delight experienced in viewing the magnificent stretches of scenery which the upper waters of our River afford, and the exciting sport of now running rapids and again rushing along with wind and current at the rate of six or eight miles an hour would prove too strong an antidote to scientific zeal, and the plants on shore would get a bare nod of recognition in passing.

The field presented to the botanist by the St. John River and its tributaries is an interesting one. Entering the Province at its extreme north-west corner the River sweeps along with varying current for nearly 300 miles before it passes our doors. Unfortunately this basin is not all ours. The south and west bank for nearly 75 miles is foreign territory; and for about 40 miles further, below Grand Falls, our slice of territory is so thin that a good-sized jump from the west bank of the River would almost land one in Uncle Sam's territory. Nevertheless we have enough left to be proud of: with a quality of soil and a beauty of landscape that will compare favorably with any other spot in the world, it needs only patient labor and perseverance to give an industrious population very great material advantages. To the botanist this is almost an unknown land. The careful and interesting paper read at a recent meeting by Prof. Bailey showed us that the River now can be made to trace the story of its birth and growth. The vegetable organizations along its banks have yet to be subjected to that examination which shall reveal data enabling us to compare them with other vegetable forms past and present, their limits in the geographical distribution of plants, with other facts that will make our botanical information of interest and value to scientific men the world over. Could our legislators realize more fully the importance of encouraging the researches of those engaged in studying our natural history and resources, they might see our Province take a more advanced position in the scientific world.

The only careful investigation of the flora of the upper St. John that has been made was that by Prof. Goodale, in the scientific survey undertaken by the Government of the State of Maine some years ago. Although that survey was confined to the State of Maine, it is presumable that the plants discovered in northern Maine have their representatives in northern New Brunswick. But we would be a poor set of scientists to accept that result without patient and determined investigation. Again: it is highly probable that we have plants in northern New Brunswick not found in Maine. It would seem to be a fact in one instance at least, for I found *Polygala Senega* at the Mouth of the Aroostook in July last. It has never been found, so far as I can ascertain, North of Massachusetts, and its habitat is south and west of that State. This is a further testimony to the fact established by that scientific survey in Maine, that the flora of the Aroostook Country has a southern character, in other words that the climate and soil in Aroostook are adapted for plants which grow several degrees south of us. In my visit to the upper St.

John and Madawaska in the Summer of 1879, I found there many of the plants found by Prof. Goodale in the Aroostook territory; many more were observed during the past summer. I shall refer to these in another part of this paper.

But the botany of the River below Grand Falls has been more systematically observed. Mr. Matthew appears to have been the pioneer in botanical investigation on the southern St. John and Kennebecasis. The botany of the River above Fredericton has been pretty carefully studied by Prof. Bailey, Prof. Fowler, Mr. Vroom, Mr. Moser and others. Mr. Fowler, though he had not much time for extended investigation of this territory, infused enthusiasm in those who were fortunate enough to enjoy his instruction, and the student now finds his work systematized by the assistance of Mr. Fowler's published lists. One of the keenest observers of plants is Mr. J. Moser of York County, who is as modest and retiring as many of the plants he so industriously seeks out. He has made some very important discoveries of rare plants in York County and further up the River. Mr. J. E. Wetmore of Andover, one of Prof. Fowler's students, is carefully working up the botany of his district as far as his time will permit. So it will be seen that the number of those who take an interest in this—one of the most attractive of the natural sciences—is steadily increasing.

May we hope that the time is not far distant when every branch of our natural history shall be industriously studied and explored. Surely a country containing a population of over a quarter of a million should not longer be satisfied with scarcely a baker's dozen of active scientific workers. It might be in order for some energetic members of this Society to organize themselves into a committee on Conchology for instance,—take up the subject where Mr. Matthew has left it and pursue it further. Could not a Committee on Entomology be formed, and, emulating the example of our Ornithological Committee, work as perseveringly in this important branch of natural history. No subject is of greater practical importance to us than a knowledge of the habits of the insects which infest our fields and woods, and yet this branch is at present almost without a representative in our Society. While acknowledging then that we are displaying industry in some directions, are we not neglecting certain other departments we cannot afford to neglect in this age of scientific study and investigation.

Early in July last our party consisting of four persons ascended the St. John River and St. Francis to Beau Lake, the extreme North-western limit of the Province. The trip was made before the spring freshet had entirely subsided, so that many of the plants that do not appear till after the water falls could not be observed. Many of the early spring plants were found to be still in flower in shaded places, others were in fruit, while the summer plants were many of them in flower in the more exposed and sunny places. Thus I had an opportunity of observing, or partially at least, a double flora, which could not have been seen earlier in the season.

Commencing our investigations at the foot of Beau Lake, which we reached at noon in one of the hottest July days, we made a peaceful invasion of the Province of Quebec. *Rhamnus alnifolius*, a comparatively rare shrub in this Province was collected at this limit of our journey. From Lake Beau to the mouth of the St. Francis the distance is about sixteen miles, which is therefore the breadth of our territory in the extreme north-west of the Province. The River is deep and the current strong, in many places foaming in rapids, in others widening into lakes and ponds. The lower portion of the river, near the St. John is crooked, the land rising into high hills of Silurian slate with little or no interval between them and the river. These hills in many places present a desolate appearance from the ravages of fire. Above Glazier's Lake there are fine forests of spruce with occasionally some magnificent pines. The rapids are short between Beau Lake and Glazier's Lake, with one exception, where the waters roar and tumble through a rocky gorge, for the distance of a quarter of a mile. To enjoy the excitement of rushing through this torrent we had hauled our boat, a few hours before, up the almost perpendicular side of a hill. At the foot of these rapids we met a lonely voyageur in his dugout preparing for the toilsome ascent. This proved to be Mr. Morrison, who went in the wilderness some years ago, cleared a fine piece of interval near the head Lake Beau, and by patient industry and perseverance has carved out for himself a fine homestead in this wilderness. His nearest neighbors are at the mouth of the St. Francis, over 20 miles distant, if we except three habitans—squatters on the shores of Glazier's Lake.

At the foot of the rapids is a beautiful little stretch of interval on which I spent a few hours, examining its vegetation. Here were magnificent clumps of the Ostrich Fern (*Struthiopteris Germanica*) almost tree-like in their luxuriant growth, some fronds being at least five feet in height. Here I found a single clump of the somewhat rare fern, with us, *Aspidium aculeatum*, var. *Braunii*, a few specimens of which I afterwards noted further down on Glazier's Lake and also at the mouth of the Aroostook. Several plants which have been heretofore detected infrequently, or in one or two localities only, appeared to be growing in profusion in this rich interval—*Polygonatum biflorum*, first found by Prof. Fowler at Fredericton, and later by Mr. Vroom at St. Stephen, is abundant here and further down the St. Francis River in the shady nooks of its rich banks. I noticed it also at Andover, where it had been detected earlier in the season by Mr. Wetmore. Here and further down the St. Francis were *Trillium cernuum*, *Caulophyllum thalictroides*, *Thalictrum dioicum*, *Viola Selkirkii*, *Anemone Virginiana*, *Vaccinium caespitosum*, *Cypripedium acaule* (with white flowers only).

Asarum Canadense (Wild Ginger) described in our last bulletin as rather common about Fredericton, its, until then, only known habitat in the Province, is abundant on the Upper St. John and St. Francis, as it was noticed on rich hillsides and intervals at nearly all stopping places. *Sanicula Marilandica* (Black Snake root) is abundant throughout the whole course of the Upper St. John. *Sanguinaria Canadensis* (Blood Root) is also very abundant in rich woods and on intervals along the Upper St. John and St. Francis. The last three plants are medicinal. Sanguinaria is a stimulant when taken in small doses, in large doses it acts as an emetic, while an overdose causes faintness, dimness of vision, great prostration, and even death. The American Journal of Science records an instance of the death of four persons some years ago, in Bellevue Hospital from mistaking a tincture of Sanguinaria for ardent spirits. *Asarum Canadense* is said to be used in some places as a substitute for Ginger; it has stimulating properties, and is said to be an effective remedy for dropsy. *Sanicula Marilandica* is spoken of in the United States Dispensatory, to which I am indebted for these facts, as a domestic remedy for intermittent fevers and St. Vitus' Dance.

Our guide, Antoine Gagnois, a squatter on the banks of Glazier's Lake, appeared to be a walking pharmacopœia and became very eloquent in speaking of the virtues of these and other herbs to be found in his neighborhood. The nearest doctor is forty miles from his habitation, and yet he boasted that he had a healthy family, although his medicine chest contained only herbs. If the theory that every region produces the remedies best adapted for the diseases that prevail in it be correct, Antoine has good grounds for the faith that is in him. A party from the United States, so he informed me, visits the St. Francis every season to dig the Snake Root and other medicinal herbs. A few years ago Prof. Fowler drew attention to the fact that of the 360 plants employed in medicinal practice in the North-eastern States, more than 230 or 65 per cent. of the total number can be collected in New Brunswick. Here, then, is a philanthropic and profitable occupation awaiting some individual who has only to make himself acquainted with the plants, and become skilful in preserving them properly, to realize a competence therefrom.

Our French guide was a keen and intelligent observer of Nature and astonished me by the accuracy of his knowledge in regard to plants. He was utterly ignorant of any of the questions that disturb nations and individuals, yet he was learned in woodcraft and modest withal. Though these Acadian French are not the kind of people that advance the material prosperity of a country, they are a happy and kind-hearted race. They were always civil and courteous and ready to assist us as far as lay in their power. Their indifference and want of energy is nowhere more apparent than in their management of the soil; buckwheat everywhere is the crop year after year on land that would produce good wheat. This "Sarrazin," as they call it, is the staple article of diet when made into bread ; when you see this bread and taste it, you cease to wonder at the want of energy of the *habitans*. With the materials in the soil to yield food products with more nourishing properties, it is to be hoped that those rich intervals of Madawaska may in the future yield wheat in abundance.

Our camping ground was at the foot of Glazier's Lake, four miles from the mouth of the St. Francis. On the third day after our arrival here we broke up camp, and a speedy run through the rapid river brought us again to the St. John.

We find the flora more varied on the Main River. One of the most abundant plants on the upper waters of the St. John is *Tanacetum Huronense* which has more finely dissected leaves and is not so strongly scented as the *Tanacetum vulgare*, or more common tansy of the fields and gardens. This *Tanacetum Huronense* is a western plant, and was discovered for the first time in New England by Prof. Goodale a few years ago on his trip down the St. John. It occurs in great abundance along the river as far as Fredericton, preferring the sandy beaches, and springing up as soon as the freshet subsides. This year I noticed it for the first time on the Lower St. John, a few patches of it growing along shore near the foot of Long Reach.

Equally abundant also are the leguminous plants, *Astragalus alpinus* and *Oxytropis campestris*, which I noticed from the mouth of the St. Francis for some distance below Grand Falls. Growing along the shore, and more especially among the disintegrating slate rocks, is *Tofieldia glutinosa*, a plant of the lily family. The last station at which I noticed it was the mouth of the Tobique. On the ledges of calciferous slate which frequently extend into the river on the Upper St. John, the beautiful *Anemone multifida* may be seen growing, and near it the *Anemone Virginiana*. I was unable to find *Anemone parviflora* which is described by Prof. Goodale as being abundant on the slate rocks of the St. John.

In 1879 I reported *Vaccinium caespitosum*, a dwarf species of blue berry, from Lake Temiscouta, province of Quebec, and it was then placed among the N. B. plants for the first time, and as likely to occur on the extreme northern border of the Province, or on high hills further south. This year I found very fine specimens of it both in flower and fruit on the St. Francis, and on the Upper St. John, just above Fort Kent, but it soon disappeared as we descended the river.

Coming out of the St. Francis River we get a magnificent view of the St. John River from the adjacent hills. Looking further up, the valley narrows and the river appears to be shut in by almost perpendicular hills. Looking down river the basin is broader, and the river here and there is dotted with Islands, luxuriant with grass and foliage. Further back from the banks are those magnificent and fertile terraces, formed in the long forgotten past, and further back, crowning the brows and summits of the hills, is a dark back ground of evergreen, the whole forming such a delightful picture of rural loveliness as may seldom be seen, even in this beautiful Province of ours. The only features in this landscape that give it a dreary sameness are the one storeyed cottages of the habitans, dirty, destitute of paint, and with a poverty-stricken look that strikes one with amazement in this land of plenty; and yet some of these cottages were not altogether lacking in beauty, for Nature, with a generous prodigality, had hidden their defects with a coat of moss! There are many districts further down river where the cottages look neat and pretty; but a little advice to the settlers—English as well as French—upon the Upper St. John, about the utility and beauty of an application of paint to their houses, would not be amiss.

On our upward trip we had a fine opportunity of seeing the country between Edmundston and Fort Kent. Our boat moved along easily, on the top of a Frenchman's wagon, on what thousands of years ago may have been the bed of the river, which now was threading its way—perhaps in some places 100 feet below us. The view from these terraces is beautiful and gave us an idea of this country that could not be obtained in coming along the river by boat, for the frequency of boulders and rapids in our path, warned us not to let our eyes dwell too long on the landscape on either side of us.

Our journey from the mouth of the St. Francis to Andover occupied four days. One day was spent in Camp, at the French village of St. Hilaire, from which place two of our party walked overland to Baker's Lake, a distance of eight miles, but no discoveries rewarded us for this toilsome trip.*

The journey to Andover, a distance of about 100 miles, was sufficiently interesting and exciting to render us forgetful of all fatigue. The water was high enough to render our passage through the rapids comparatively safe. Sometimes we sped along before the wind at the rate of six or eight miles an hour, at others the winds opposed our course when we came to anchor or toiled at the oar. Sometimes the thermometer stood in the nineties, and then again a grateful shower brought relief. During our passage through the gorge below Grand Falls a terrific thunderstorm lent a strange weirdness to the scenery, and gave it a grandeur which pen could not adequately describe. The heavy storm cloud seemed almost to rest on the top of the perpendicular cliffs on each side of us, and gave an inky blackness to the rushing waters, through which we were gliding so rapidly; peal after peal of thunder followed in such quick succession that the echoes seemed never to cease; the lightning only relieved the blackness of the gorge to make its blackness more sombre than ever. Suddenly, before the violence of the storm seemed to have abated, the sun shone out behind us and instantly a rainbow formed, extending from the sides of our boat up the cliffs, arching over the space of sky beyond.

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* Along the banks of the St. John, near St. Hilaire, the following plants were noticed in addition to some already named—*Cerastium arvense*, *Silene inflata* (very abundant), *Castilleia pallida*, *Prunus pumila* (very abundant on islands in the river) *Geum album*, *Aster graminifolius* *Leontodon autumnale*, *Campanula rotundifolia*, *Smilax herbacea*, *Allium Schoenoprasum*,

From our camping ground at Andover we made visits to Aroostook Falls and the Narrows at the mouth of the Tobique. The Aroostook Falls are about two miles from the junction of that river with the St. John. For nearly a quarter of a mile the river confined within narrow walls of trappean rock rushes among huge boulders and chasms, presenting a scene of wild grandeur and confusion from the tops of the cliffs, nearly 200 feet above. At the lower extremity of the Falls, growing on the rocks, I found *Woodsia glabella* a rare fern in this Province, having been found only at one place by Prof. Fowler—at the Tunnel, Restigouche. That station, I think, is now obliterated by railway excavations. It differs from *Woodsia Ilvensis* which grows in the neighborhood of Greenhead, St. John, and is in great abundance on Long Island, Kennebecasis, being smooth instead of chaffy, and having linear fronds, whereas the *W. Ilvensis* has lanceolate fronds.

Growing on the cliffs, above the Falls was *Polygala Senega*, to which I have already referred as being new to New Brunswick and the North-eastern States. It is a perennial plant with alternate leaves throughout, with white flowers in a solitary spike. The stems, proceeding from thick, knotty rootstocks, have lanceolate leaves. Near the Falls I observed *Aquilegia vulgaris*, which, though a garden plant, had long since ceased to have any fostering care, and was evidently thriving and enjoying its independent existence. *Blitum capitatum*, described in Prof. Fowler's list as being found in gardens, was pointed out to me by Mr. Wetmore, growing in the woods at Andover, and evidently indigenous. This plant, which gets the name of Strawberry Blite from its bright red fruit, is very frequently seen in gardens in the country, but has not hitherto been considered a native of this Province. It has, I believe, been ong known to the Indians about Tobique, who formerly used the juice of the fruit to stain their baskets.

For many miles below the Grand Falls the river is pent up in a narrow channel, through which the current is rapid, carrying the rich material which it constantly wears away, and depositing it on the intervales farther down the river. A few miles below the Falls the terraces again make their appearance. at first high up above the present bed of the river, and gradually falling so that below the mouth of the Aroostook the more recent terraces are but a few feet above the high water mark. Here some of the richest land in the Province may be found. In the rich thickets along the river-banks, many rare plants were growing in the greatest luxuriance, including *Adiantum pedatum*, our most beautiful fern; *Phryma Leptostachya Verbena hastata*, *Amphicarpæa monoica*, *Campanula aparinoides*, *Sanguinaria Canadensis*, *Caulophyllum thalictroides* and many others. Across the river from Upper Andover is the Indian reserve, above the mouth of the Tobique, which contains some of the richest land in the Province, but the Indians make very little use of it for agricultural purposes. At the Narrows, near the mouth of the Tobique, was found *Shepherdia Canadensis* and the somewhat rare *Arnica mollis*, not before reported from the Upper St. John. Here were also *Halenia deflexa* and a new form of Pyrola—*P. rotundifolia*, var. *uliginosa.*

At Eel River, York County, the last place where any extended observation was attempted, several rare plants were met with, including *Allium tricoccum*, *Orchis spectabilis*, *Habenaria orbiculata*, *Geum album*, *Verbena urticifolia*, and others

I regret that the great extent of my journey prevented my remaining long enough in one place, thoroughly to examine its flora. There are many rich districts between St. John and Grand Falls which on closer inspection will reward abundantly the zeal and industry of the botanist who shall explore them.

In closing this paper I have to refer to a very remarkable discovery in New Brunswick of a rare fern—*Scolopendrium vulgare* which was found near Woodstock, by James Sutton, Mrs. Charles Connell's gardener. Its discovery may be said to be almost accidental; and we are indebted to Peter Jack, Esq., of Halifax, a gentleman who devotes his leisure to the study and cultivation of ferns, for bringing this plant from its obscurity, and making it known for the first time in New Brunswick. While Mr. Jack was in Woodstock, in September, he noticed this fern amongst the plants in Mrs. Connell's garden, and on inquiry, he was told that it had been found in the woods, a short distance from town, the previous autumn. He was incredulous, as the fern, though common in England, is rare, or I may say unknown hitherto, in N. E. America. A search for additional specimens proved fruitless, but Mr. Jack writes me that since his return to Halifax, he has received several specimens of the plant which Mr. Sutton was enabled to find after a more diligent search. One of these specimens, dried, Mr. Jack has been kind enough to present to this Society. The only stations in Gray's Botany for this fern are, one or two places in Western New York, and in Ontario, so that its discovery as far east as New Brunswick is a most important one.

Another fern which Mr. Jack sends us is also new to the Maritime Provinces—*Aspidium Goldianum.* He found it near Woodstock in September. The frond of this fern is broadly ovate, the pinnae very long, and the fruit dots very near the mid-vein, quite different in this respect from *Aspidium marginale* which has the fruit dots on the margin of the divisions of the pinnae. Mr. Jack informs me that a Botrychium which he found at Rapide de Femme near Grand Falls, has been pronounced by Prof. Lawson of Halifax B. *ternatum*, var. *rutaefolium.* I have not seen this fern. Mr. Jack's visit to Woodstock was a memorable one, therefore, and the cordial thanks of the Society are due him, not only for the specimens sent us, but for the value of the discoveries made.

NOTE.—In the district which I have explored the past ew years —the neighborhood of St. John City, Lower Kennebecasis, and along the course of the St. John River—the following plants, marked as rare or occasional in previous lists, have been detected not infrequently:—Tussilago farfara (very abundant weed about the City), Viola lanceolata, Hyoscyamus niger (ballast), Nuphar luteum, var. pumilum (very abundant lower course of Salmon River, Queens Co., also at Keswick,—Mr. Brittain reports it from Petitcodiac), Trifolium procumbens (noticed it this year as far inland as Prince

William York Co., also at Norton, K. C.,) Spiraea tomentosa, Fragaria vesca, Potentilla tridentata (very abundant and large on Douglas Mountain, common on upper St. John), Calla palustris, Hamamelis Virginica (also Petitcodiac, Mr. Brittain), Claytonia Caroliniana, Cornus circinata (also by Mr. Brittain, Petitcodiac), Aralia racemosa, Aster nemoralis, A. graminifolius (abundant clefts of rocks, upper St. John), Leontodon autumnale, Hieracium Canadense (by Mr. Brittain also, in King's County), Sagittaria gramineus, Goodyera repens, Spiranthes Romanzoviana, Agrostis canina, Ætonia Pennsylvanica, Glyceria elongata, Aira cæspitosa, Avena striata (the two latter also by Mr. Brittain, Petitcodiac, Cystopteris bulbifera, Woodsia Ilvensis, Prunus pumila (very abundant on islands, upper St. John), Apocynum cannabinum, Tofieldia glutinosa, Nabalus racemosus (Mr. Wetmore, Grand Falls) Eupatorium ageratoides, Habenaria obtusata, Aster aestivus, Poten lilla arguta.

The following, if not all of them abundant, are at least widely distributed, as they have been reported, with one or two exceptions, from nearly all the districts so far explored in the Province: Ranunculus recurvatus, R. Pennsylvanicus, R. Flammula, var. reptans, Dentaria diphylla, Sanicula Marilandica, Lonicera cærulea, Rudbeckia hirta (spreading in some southern districts of Province) Liparis Lœsellii, Allium Schœnoprasum, Viola canina, var. sylvestris, smilax herbacea, Arethusa bulbosa, Pogonia ophioglossoides, Monotropa uniflora, Moneses uniflora, Listera cordata, Sedum Rhodiola (St. George, 5 mls. from Sea Coast, J. Vroom), Myosotis laxa, Campanula aparinoides, Veronica officinalis.

ADDITIONAL LIST OF NEW BRUNSWICK PLANTS.

The following List of Plants, additions to the flora of this Province, together with the occurrence of rare species, attests to the diligence and attentive observation of our botanists during the past year. This diligence has been rewarded by the discovery of nearly FORTY species not hitherto known to exist in the Province. The occurrence of several of these species, such as *Scolopendrium vulgare, Echium vulgare, Polygala Senega, Cardamine pratensis,* is as unexpected as it is gratifying, as some of these have been found for the first time in North Eastern America.

Mr. Brittain has explored an important field, the eastern portions of St. John and Kings Counties, and parts of Westmoreland County, with marked success. His discoveries have been numerous and important as the subjoined list will show. Mr. Vroom has been successful in finding in Charlotte County many species not before known to exist there. Mr. Wetmore at Andover is in the centre of one of the richest fields for the botanist to be found in the Province, a portion of which he has explored with success the past season.

The Society is indebted to the above named gentlemen, to Mr. Moser, of York County and to Peter Jack, Esq., of Halifax, for the discovery here of new species.

Owing to circumstances the Committee on Botany has not been able to meet this year. Mr. Vroom has, however, communicated to me much valuable information which is embodied in the List appended.

14. Ranunculus sceleratus, L. St. Stephen, J. Vroom.
30. Sanguinaria Canadensis, L. Petitcodiac, J. Brittain.
37a. Cardamine pratensis, L. Cuckoo Flower. St. Patrick, Charlotte County, J. Vroom; rare.
55a. Viola Selkirkii, Pursh. Near Half-Moon Lake, St. John; St. Francis River, Hay.
56a. Viola Canadensis, L. Canada Violet. Near Woodstock, R. Chalmers, Peter Jack.
81. Cerasteum arvense, L. St. Francis, Madawaska County, G. U. Hay.
94. Tilia Americana, L. Fine specimens of this tree (Bass Wood) found growing along shore of Long Reach, St. John River, and Lower Nerepis, Hay.
106. Rhamnus alnifolius, L'Her. St. Francis River, Hay; Petitcodiac, J. Brittain.
113a. Polygala Senega, L. Seneca Snakeroot. Aroostook Falls and Tobique Narrows, Victoria Co., Hay and Wetmore.
114. Trifolium arvense, L. Lever Settlement, Charlotte County J. Vroom.

130. Desmodium Canadense, D. C. Along Hammond River, King's County, Brittain.

134a. Vicia tetrasperma, L. Petitcodiac, Brittain.

137a. Apios tuberosa, Moench. Upper St. Croix, Vroom.

139. Amphicarpæa monoica, Nutt. Petitcodiac, Brittain; Upper St. Croix, Vroom; Andover, Wetmore.

145. Geum album, Gmelin. St. John and Kennebeccasis Rivers, Hay. "Common about Hampton," Brittain.

145a. Geum Virginianum, L. Hampton and Petitcodiac, Brittain.

180. Parnassia Caroliniana, Michx. Andover, Victoria County, J. E. Wetmore.

187a. SEDUM ACRE, L. Mossy Stone Crop. Hampton, Brittain. (I find a specimen in my collection marked Norton, 1877, apparently overlooked in former lists.)

192. Hippuris vulgaris, L. Digdeguash. Charlotte Co., J. Vroom.

194. Circæa Lutetiana, L. Lower Norton, Brittain; Eel River, York County, Hay.

199. Ludwigia palustris, Ell. Petitcodiac, Nauwigewauk, Taborville, Brittain.

201a. Sanicula Canadensis, L. Black Snake Root. Lower Norton and Sussex, Brittain.

245. Nardosmia palmata, Hook. St. John, Herbert E. Goold; Petitcodiac, Brittain.

260. Erigeron annuum, Pers. Daisy Fleabane. Sweet Scabious. "Rather common about Hampton and Petitcodiac," Brittain.

264. Solidago squarrosa, Muhl. Andover, Victoria Co., Wetmore.

271a. Solidago neglecta, Torr. and Gray. St. John County, Hay.

272a. Solidago nemoralis, Ait. "The most abundant Solidago in western part of Charlotte Co.," Vroom.

282a. Bidens connata, Muhl. Swamp Beggar-ticks. Petitcodiac, Brittain.

287a. CHRYSANTHEMUM SEGETUM, L. Ballast, St. John, Hay, 1881.

303. Senecio aureus, L. var. 2, Balsamitae, Gray, Rocky shores Kennebeccasis, Hay. Var. 3, lanceolatus, Oakes, Hartland, Carleton Co., Hay. This is one of the most variable plants to be met with along the St. John River. Another form observed at Hartland, Carleton Co., had kidney shaped leaves, the under side of a rich purple color.

304. Arnica mollis, Hook. Tobique Narrows, Hay; Andover and Grand Falls, Wetmore.

335a. Vaccinium cæspitosum, Mx. St. Francis River, and sparingly along shore Upper St. John, Hay.

338a. Arctostaphylos Uva-ursi, Spreng. Bearberry. Kennebeccasis Island, Hay.

347a. Pyrola rotundifolia, L., var. uliginosa, Gray. Andover, Hay.

367a. Utricularia intermedia, Hayne. St. Patrick, Charlotte Co., Vroom; Otty's Lake, near Hampton, Brittain.

373a. Limosella aquatica, L., var. tenuifolia, Hoffm. Near St. Stephen, Charlotte Co., Vroom; Scarce.

382a. Bartsia Odontites, Hudson. Abundant on Island, Falls, Mouth St. John, Hay.

384a. Pedicularis Furbishiae, Watson. "Growing on wet banks St. John River from Van Buren, Me., south about sixty miles. Allied to P. Canadensis and dedicated to Miss Kate Furbish,"—Prof. Sereno Watson. Upper St. John, Hay; Andover, Wetmore.

386b. Phryma Leptostachya, L. Andover, Wetmore; Lower Norton, Brittain.

400a. GALEOPSIS LADANUM, L. Hemp Nettle. Ballast, St. John, 1881, Hay.

401. Stachys palustris, Mx., var. aspera, Gray. Quaco, Brittain; Partridge Island, Hay; St. Andrews, Vroom, 1880.

403a. ECHIUM VULGARE, L. Blue Weed. Viper's Bugloss. Quaco and Petitcodiac, Brittain. This last addition to our troublesome weeds is rare in N. E. America, although widely distributed in Europe and Northern Asia. It is a rough, bristly biennial, has a red-purple corolla in bud, afterwards changing to a brilliant blue.

409a. Cynoglossum Virginicum, L. Wild Comfrey. Petitcodiac, Brittain.

418. GENTIANA AMARELLA, L., var. acuta, Hook. f. Island, Falls, Mouth of St. John, Hay.

420a. Limnanthemum lacunosum, Grisebach. Several stations in Kings County, Brittain.

424. Asclepias incarnata, L. Keswick, Hay; Lower Norton and Hammond River, Brittain; Charlotte County, Vroom.

431. Blitum capitatum, L. Andover, Wetmore. Doubtless indigenous.

431a. Polygonum hydropiperoides, Mx. Mild Water-pepper. Bloomfield, K. C., Brittain.

469. Pilea pumila, Gray. Petitcodiac and Havelock, Brittain.

469*. CANNABIS SATIVA, L. Hemp. "Spontaneous for years, near Taborville Bridge, K. C.," Brittain.

503. Pinus Banksiana, Lambert. "Forms thick groves, extending for miles about Petitcodiac and Anagance, where it is a handsome tree from 30 to 50 feet high, valuable for timber," Vroom.

517a. Symplocarpus fœtidus, Salisb. Near Episcopal Church, Lower Hammond River, Brittain. Said to be a troublesome weed on the Stock Farm.

532a. Potamogeton Robbinsii, Oakes. Hampton and Petitcodiac, Brittain.

535. Scheuchzeria palustris, L. Tay's Mills, York County, Moser; St. Stephen, Vroom.

539a. Orchis spectabilis, L. Eel River, York County, Hay.

541a. Habenaria viridis, R. Br., var. bracteata, Reichenbach. Taborville, Brittain.

546. Habenaria blephariglottis, Hook. Tay's Mills, York Co., J. Moser.

547a. Habenaria lacera, R. Br. Hampton, Brittain.

549a. Goodyera pubescens, R. Br. Petitcodiac, Brittain.

556. Calypso borealis, Salisbury. The great beauty of this rare plant is an excuse for another reference to its whereabouts. Many specimens of it were found near the Half-moon Lake, near St. John, this year, and Mr. Brittain sends a handsome specimen from Petitcodiac, found by Mr. Vroom.

581a. Polygonatum biflorum, Ell. St. Francis and Upper St. John, Hay, Wetmore; Petitcodiac, Brittain.

583a. Allium tricoccum, Ait. Eel River, York Co., Hay; near Hampton, Brittain.

598. Pontederia cordata, L. Grand Lake, and at several points on St. John River, Hay; quite common in western parts of Charlotte County, Vroom.

607a. Scirpus Clintonii, Gray. Digdeguash, Vroom.

607b. Scirpus subterminalis, Torr. Petitcodiac, Brittain.

619a. Rhyncospora fusca, Roem. and Schultes. Beak Rush. Near Hampton, Brittain.

645. Carex lanuginosa, Mx. Petitcodiac and Moncton, Brittain; Upper St. John, Hay.

683a. Zizania aquatica, L. Indian Rice. Water Oats. Abundant in water at Hampton and other places in King's County, Brittain.

692a. Muhlenbergia Mexicana, Trin. Petitcodiac, Brittain.

696. Oryzopsis asperifolia, Mx. Common about Petitcodiac, Brittain.

699a. Graphephorum melicoides, Beauv. Titusville, K. C., Brittain.

710a. Poa caesia, Smith. Taborville, K. C., Brittain.

714b. Festuca nutans, Willd. Lower Norton, Brittain.

718. Phragmites communis, Trin. St. Stephen, Vroom.

723. Elymus Canadensis L. Sussex and Petitcodiac, Brittain.

734a. PANICUM GLABRUM, Gaudin. Hampton, Brittain.

748. Asplenium viride, Huds. Becoming more common about St. John in the moist, shady clefts of limestone rocks. Have found it at no less than seven stations near St. John the past year, Hay.

750a. Scolopendrium vulgare, Smith. Near Woodstock, Jas. Sutton, 1881; identified by Peter Jack, Esq., Halifax; rare.

757a. Aspidium Goldianum, Hook. Near Woodstock, Peter Jack. Probably rare in New Brunswick.

760. Aspidium aculeatum, Swartz, var. Braunii, Koch. St. Francis River, Andover, Hay.

766. Woodsia glabella, R. Br. Aroostook Falls, Hay and Wetmore; Grand Falls, Peter Jack.

771a. Botrychium matricariaefolium, Eaton. Petitcodiac and Titusville, K. C., Brittain, 1881. A slender and beautiful species, from 3 to 9 in. high; a smaller form growing in moss.

NOTE ON LINARIA CYMBALARIA.

BY JAMES VROOM.

It may not be generally known that the rare phenomenon of apheliotropism, or turning from the light, is observable in the peduncles of the common Kenilworth or Coliseum Ivy (Linaria Cymbalaria.) This little plant raises its flower buds an inch or more above the trailing stem; but, as soon as the flower opens, the base of the flower stalk begins to bend downward, the middle of the stalk at the same time bending in the opposite direction, so that the lower part of the peduncle takes the form of the letter S laid on its side (∞)—the portion immediately below the flower still being erect. The second curvature, however, does not remain, but passes slowly along the flower stalk, drawing the flower downward, so that soon after the corolla falls the growing seed pod lies upon the ground, or, where the stem is raised high enough to admit of it, points directly downward. This might seem to be due to the influence of gravitation, but when the plant is grown before a window (as we frequently see it here) the fruit stalks, instead of reaching downward, are found extending towards the darkest part of the room.

In a room with one window, a pot of Linaria was hanging near the blind, so that the light could not reach it from above. The peduncles, which lengthen considerably after flowering, stretched out two or three inches horizontally, and where they received the strongest light from below even took an upward direction. The pot was turned around so that the stalks were parallel with the glass. In three hours the growing peduncles could be seen turning away from the light, and in a day or two most of them were found bent at right angles, the curvature in this case seeming to begin immediately below the seedpod. Yet a certain amount of light is necessary for perfecting the seed; for when moved to a darker place the peduncles, though still pointing towards the darkest part of the room, were "drawn" to twice their usual length and presented the general appearance of a plant suffering from want of sufficient light.

ORNITHOLOGICAL NOTES.

BY MONTAGUE CHAMBERLAIN.

The members of this society who are interested in Ornithology have, during the year that has just closed, made considerable progress in the study of the distribution of the species occurring within the Province and have acquired other information which will be utilized when a revision of the catalogue of birds, published in the last number of this Bulletin, shall be undertaken. This revision must however be deferred for a number of years unless more workers can be induced to enter the field, as the present number of observers is very limited and these have but little opportunity to prosecute the study and there yet remains an immense extent of country of which no systematic exploration has been made.

In this connection it might be stated that the Committee would gladly avail themselves of the co-operation of persons who are not members; and if assistance was rendered them by residents in the various districts of the Province the value of the annotations to the catalogue would be very largely increased and the time hastened when its revision could be satisfactorily completed.

The County of St. John has as usual received most attention from the ornithologists of the society during the year, and the previous determinations regarding the birds found there have been confirmed and an addition made to the list of several species not previously observed.

The species new to the locality are as follows :—*

AMERICAN TITLARK (*Anthus ludovicianus*).—During October last several large flocks were observed on the Courtenay Bay Flats, at Little River, and in the vicinity of tne Manawagonish marshes.

LAPLAND LONGSPUR (*Ceatrophanes lapponicus*).—Mr. Pinkirton took three specimens near the Ballast Wharf and a few others were observed by Messrs. Daniel and Morrissey, all in the last week of December, and in every instance they were in the company of Snow Buntings.

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*Several of these "notes" have been recorded by the writer in the January number of the Bulletin of the Nuttall Club.

Piping Plover (*Ægialites melodus*).—On May 6th Mr. Ellis shot two of this species at St. Martins and on May 9th Baron de Tuyll secured two at Maces' Bay.

Whistling Swan (*Cygnus americanus*).—The only example of this species known to have been observed in this Province was shot by George Barnhill, Esq., at Belvidere Lake on April 8th.

Redhead Duck (*Aethyia americana*).—On October 16th three were offered for sale in the St. John market and on the 27th of the same month two more were to be seen there; all were said to have been taken within 20 miles of St. John.

Two of the "shore birds," **Ring-necked Plover** (*Ægialites semipalmatus* and **Least Sandpiper** (*Actodromas minutilla*) were observed during the last of May, an unusual occurrence, for though both species are exceedingly abundant in the autumn neither had been seen previously in the spring.

Among other interesting occurrences of the year was that of a flock of the **Ipswich Sparrow** (*Passerculus princeps*), discovered by Mr. Alfred Morrissey on Courtenay Bay Flats on April 11th; also several **Pine Grosbeak** (*Pinicola enunoleator*) that spent the summer in the vicinity of Sandy Point and were made the subject of special study by Mr. James W. Banks. One pair was discovered at work at the foundation of a nest and the female accidentally killed.

Several explorations were made into the adjacent counties of Kings and Queens, notably one under the leadership of Mr. Harold Gilbert. Among other questions of interest which the observations then made have determined is the confirmation of the statement made by the writer in the Catalogue of New Brunswick Birds, (p. 37,) that many of the species of birds rarely met with in the vicinity of the coast of the Bay of Fundy during the breeding season are much more abundant at that time beyond the line across which the humidity and low temperature so characteristic of this coast at that season do not penetrate, said line being drawn some 15 to 20 miles from the shore of the Bay.

In an article on the Birds of the Catskill Mountains by Mr. Eugene P. Bicknell, published in the Transactions of the Linnæan Society of New York, lately issued the author advances the theory that the representatives of the Canadian Fauna which were observed at the higher altitudes of the mountains were attracted thither, in their choice of a breeding resort by the humidity of the atmosphere and the consequent character of the vegetation. But here in New Brunswick the same species of birds mentioned by Mr. Bicknell act exactly the reverse to what they do in the Catskills. We have much the same differing atmospheric conditions and in similar relation, to state it broadly, as that of the higher and lower altitudes of the mountains, but while the birds of the Catskills appear to seek the cooler and more moist regions to breed in, the mass of our Provincial birds (not only the *sylvicolidæ* as previously noted) retire from the humid zone and build in the warmer, drier atmosphere of the interior. Even the few species that are common near the coast at this season are equally as abundant beyond.

With these facts before us and the emphatic contradiction they appear to yield to Mr. Bicknell's theory, must not some other cause for the migration of these species be sought for?

In June last Mr. Fred Daniel and the writer accompanied Mr. H. A. Purdie of the Nuttall Club, Cambridge, on a collecting trip through Madawaska County making *en route*, a hurried visit to Washademoak Lake.

During our stay in the vicinity of Edmundston we were enabled to indentify 74 species of birds, and the list of their names exhibits but slight variation from that obtainable at almost any point on the St. John river south of that locality.

Among the conspicuous absentees noted were Bluebird, Mourning Warbler, Rose-breasted Grosbeak, Crow Blackbird, Least Fly catcher (only one was heard at Edmundston and another was heard at Fredericton) and Blue Jay, all reported by Mr. Batchelder as more or less common at Grand Falls, but a few miles south, and we missed the Bobolink and the Red-widged Blackbird which are such obstrusive residents of the river banks from Woodstock to Westfield.

One Grass Finch was heard singing at Saint Hilaire and another at Cole's Island, at which station it divided with a Whip-poor-will the chief interest of the party; but the swift proved a perfect will-o-the-wisp to the individual who attempted its capture, the ventrilequil character of its voice being very marked.

At Edmundston some six examples of the Cape May Warbler were secured and as many of the Philadelphia Vireo. Neither of these species have been observed near St. John though Mr. Boardman reports the Cap May as a regular visitor to the neighborhood of St. Stephen and breeding there. The Philadelphia is recorded in New England-Bird life as the rarest of the Greenlets in those states; and Mr. Everett Smith reports it "uncommon" in Maine. It is not given by Mr. Nathan C. Brown in his Catalogue of birds of the vicinity of Portland, and I can find a record of but two examples for Eastern Maine, one taken by Professor Verrill at Waterville in 1863 and the other by Mr. George A. Boardman at Calais in 1872. It not occurring regularly in Eastern Maine, and Mr. Batchelder finding it at Grand Falls in 1881, and our meeting it again in 1882 at Edmundston suggests the idea that the species must pass north by a western route, and journey more directly east after reaching the higher latitude. The specimens we secured were evidently mated.

SUMMARY OF MEETINGS.

FEBRUARY 7TH.

Dr. LeBaron Botsford, President, delivered his annual address, answering the questions—What is a Natural History Society?—What its objects and why is it necessary?—in a clear, pointed and interesting manner.

MARCH 7TH.

Mr. Robt. Chalmers read the paper of the evening on the Surface Geology of the Bay of Chaleur Region, with particular reference to the stratified marine clay and sands which form its shores and estuary deposits; its more recent formations, and the evidence of a subsidence of land which has taken place in the northern part of the Province; together with observations on drift phenomena, and other interesting facts on the geological structure and history of the region mentioned.

APRIL 4TH.

Mr. Matthew's lecture this evening on the *Paradoxides* of the St. John group was descriptive of the general relations of *Paradoxides* to other forms of the animal kingdom; the conditions under which the fossils of this genus and other Cambrian organisms are found near St. John; and descriptions of two new species and several varieties found in the rocks at St. John. Specimens of the St. John fossils and of species of *Paradoxides* from Bohemia were exhibited. The Saint John fossils have been described in a paper communicated by Mr. Matthew to the Royal Society of Canada at its inaugural meeting in May last.

MAY 2ND.

Dr. Walker delivered an address on the formation and growth of Coral. After describing the animal, which is of the radiate type, he shewed what the coral formation really is, and explained its composition. He punctured several of the old theories about the insect (?) and the results of its labors, and compared these with the later revelations of coral formation as described by Darwin.

JUNE 6TH.

Jas. A. Estey, Esq., read the paper of the evening, an interesting account of the Life and Writings of the Dead Naturalist,—Charles Darwin.

JULY 4TH.

The leaders of the several sections of the Field Meeting, held at Duck Cove on the 24th ult., presented reports shewing their observation of the Natural History of that region.

A contribution from Mr. Jas. Vroom, St. Stephen, on some peculiarities he had noticed in the *Linaria Cymbalaria* was read. The paper is re-produced in another part of this bulletin.

AUGUST 1ST.

The paper of the evening was read by Mr. G. F. Matthew, on the Lacustrine Formation of the Torryburn Valley. It is published in another part of the Bulletin.

SEPTEMBER 5TH.

Prof. Bailey read the paper of the evening on the St. John River Valley. He referred to the great importance which attaches to rivers from a geological stand-point. The St. John River basin comprises no less than eight geological formations. The character of this basin is greatly influenced by the falls at the mouth and the "narrows" through which the water is driven so impetuously by the flowing and ebbing of the tide. The mouth of the St. John at one period was probably about a mile west of the present mouth.

OCTOBER 3RD.

The paper of the evening on our Native Wading Birds was read by Mr. M. Chamberlain. He gave a very interesting description of their habits and principal characteristics, explaining and illustrating his remarks by means of the very complete collection in the Society's rooms.

NOVEMBER 7TH.

The paper of the evening—The Botany of the Upper St. John—read by Mr. G. U. Hay, is published in the Botanical section of this Bulletin.

An extra meeting was held in the Society's rooms on the evening of November 10, when Dr. Geo. Patterson, of Pictou, gave a very interesting oral address on the Stone Age of the Micmacs, illustrating his remarks by numerous relics.

DECEMBER 5TH.

A resolution to accept the invitation of the Royal Society and become incorporated with it was adopted.

Mr. Harold Gilbert read a paper on the "Singing Birds of New Brunswick," giving a short history of the numerous families that comprise this interesting order of birds that visit our Province dur- the summer and winter, pointing out many peculiarities in their migration, and shewing from specimens taken from the Museum of the Society, the distinguishing characteristics of each family. Reasons were given for many of their peculiarities in migrating, shewing that birds which are now uncommon in this Province may yet become quite common, as orchard, field and garden take the place of our forests which now cover the greater portion of our Province. From carefully prepared notes shewing the vast amount of insect food required by many of these birds, they were shewn to be the most useful and most deserving of protection of any of the orders of our birds.

JANUARY 10TH, 1883.

The paper of the evening, adjourned from January 2nd, was read by Mr. W. F. Best, on the Spectroscope and its Uses. It was an intelligent and interesting description of an instrument that has caused wonderful progress in the sciences, chiefly of astronomy and chemistry. Many interesting experiments were shewn, illustrating the uses of the instrument.

REPORT OF COUNCIL.

The Council of the Natural History Society of New Brunswick beg leave to submit the following summary of the operations of the Society for the past year.

MEMBERS.

There are at present 1 Honorary Member; 6 Life Members; 70 Ordinary Members; 30 Associate Members, and 32 Corresponding Members; being an increase for the year of 30 Ordinary Members; 15 Associate Members, and 8 Corresponding Members.

The Recording Secretary reports as follows:—

During the year just closed twelve regular meetings of the Society have been held at which the papers mentioned in the preceding summary of meetings were read.

The following free elementary lectures on scientific subjects were delivered in the rooms of the Society:—

Jan'y 10.—Industrial Drawing, by Mr. G. Ernest Fairweather.
Feb'y 27.—Chemistry, Air and Water, Dr. Coleman.
March 21.—The Microscope, Dr. Allison.
April 18.—Birds and Nests, Mr. M. Chamberlain.
May 16.—Spring Plants, Mr. G. U. Hay.

Mr. Chamberlain has also, upon several occasions, addressed the children from some of the Public Schools in the Society's rooms, illustrating his remarks by specimens from the Ornithological collection.

A most successful Field Meeting was held by the Society, in connection with the Eclectic Reading Club, at Duck Cove, Lancaster, on June 24th, and a well-attended Conversazione was held in the Society's rooms on Thursday, 27th April.

LIBRARY.

The Librarian reports that there have been added to the Library thirty-one books and pamphlets during the past year; and that the books have been catalogued and numbered.

FINANCE.

The Treasurer reports that the cash expenditure for the past year amounts to the sum of $275.57. The income during the same time, from all sources, amounts to $276.58; leaving a balance on hand of $1.01.

The Council have much pleasure in stating that, since the last annual meeting, the cases for the collections of native birds, referred to in the last Annual Report, have been procured at a cost of $400, and are now placed in the rooms of the Society. Part of the cost of these cases has been paid by subscriptions received from friends of the Society, whose names appear in the list of benefactors appended to this Report, and part has been paid out of the general fund of the Society; but there is a balance remaining unpaid amounting to about $120.00 In the early part of the year the lecture room, being found insufficient in size, was extended by cutting an archway into the adjoining room, and the capacity of the rooms for meetings and lectures has been greatly increased.

W. J. WILSON,
Sec. to Council.

DONATIONS TO THE MUSEUM,

FOR THE YEAR ENDED 17TH JANUARY, 1883.

DONORS' NAMES.	DONATIONS.
"A friend," through L. C. ALLISON, M. D.,	A number of specimens of Minerals and two Barnacles of extraordinary size.
W. E. COLLIER, ESQ.,	Apatite Crystals from Ottawa.
THOS. E. DYER, ESQ.,	Amethystine Quartz and Sea Fan, (Gorgonia.)
J. W. BANKS, ESQ.,	Specular Iron Ore.
G. M. DUNCAN, ESQ., M. D., of Bathurst,	Quartz Arrow-heads, Fossil Shell, Spirifer, Claw of a Raptorial Bird entangled in the burrows of Pholas.
R. PENNISTON STARR, ESQ.,	Fossil Root (Stigmaria ficoides).
W. I. LOGAN, ESQ.,	Case of Fossil Shells, Minerals, &c., from Palestine and United States.
G. E. SNIDER, ESQ.,	Fossil Shell from Chincha Islands.
ALEXANDER ROSS, ESQ.,	Two Fossil Fish from Devonian Formation at Dalhousie.
J. H. THORNTON, ESQ.,	Fossil Wood (Dadoxylon) from Point Wolfe Quarries.
MISS E. MURRAY,	Shark Teeth from phosphate beds of South Carolina.
LT. COL. TAYLOR,	Fossil Fern, (Pecopteris).

DONATIONS TO THE MUSEUM.—*(Continued.)*

DONORS' NAMES.	DONATIONS.
C. U. HANFORD, ESQ.,	Sand-dollar, (Clypeaster) taken from the stomach of a codfish. Mutilated Claw of a Lobster repaired by the animal.
J. H. WRIGHT, ESQ.,	Hymenopterous Insect and Cocoon of a Wasp.
R. P. CROOKSHANK, ESQ., M. D.,	One Small Brown Snake.
GEO. H. PURDY,	Four Embryo Snakes; 3 Albatrosses.
R. BRITTAIN, ESQ.,	Five Sponges from Basin of Minas.
PETER JACK, ESQ., Halifax,	Two dried specimens of Ferns.
GEO. U. HAY, ESQ.,	Twenty Native Plants.
MASTER FRED. CAMPBELL,	One Dragon Fly. Irised Coal.
GIBSON WILLIAMSON, ESQ., Oak Point,	Two Cases Insects. One Cat Bird.
ROBT. HAZEN, ESQ.,	One Blue Heron. One Turnstone. 1 Least Sandpiper. 1 Canada Jay.
W. F. BEST, ESQ.,	Four Ptarmigan, (2 in Winter and 2 in Summer plumage), from Newfoundland.
W. GILPIN, ESQ.,	One Eider Duck. 1 White Winged Coot. 1 Herring Gull.
GEO. HARE, ESQ.,	One Shell Drake.
JAMES DANIEL, ESQ., M. D.,	One Loon.
H. A. PURDIE, ESQ., Boston,	Nest and Eggs of Chipping Sparrow. " " " Marsh Hawk.
JAS. W. BANKS, ESQ.,	Four Nests and Eggs of Native Birds.

DONATIONS TO THE MUSEUM.—*(Continued.)*

DONORS' NAMES.	DONATIONS.
FRED. W. DANIEL, ESQ.,	Seven Native Birds, and three Nests and Eggs of Native Birds.
HAROLD GILBERT, ESQ.,	Four Native Birds.
ALFRED MORRISEY, ESQ.,	Eight Native Birds.
M. CHAMBERLAIN, ESQ.,	Forty-six Native Birds. Twenty-seven sets of Eggs, and eleven Nests of Native Birds. Two Squirrels. One Chipmunk.
J. W. WILLIAMS, ESQ.,	Solitary Sandpiper. Skeletons of heads of Robins. Least Sandpiper and Ruby-throated Humming Bird.
JAMES ANDERSON, ESQ.,	Pileated Woodpecker.

DONATIONS TO THE MUSEUM FUND.

HON. ISAAC BURPEE,....	$25.00	GEN. D. B. WARNER,....	$ 5.00
WM. ELDER, ESQ.,.........	5.00	D. C. DAWSON, ESQ.,......	2.00
T. W. DANIEL, ESQ.,.......	10.00	GEO. F. SMITH, ESQ.,......	5.00
L. B. BOTSFORD, M. D.,....	25.00	W. F. HATHEWAY, ESQ.,...	5.00
G. F. MATTHEW, ESQ.,......	10.00	J. C. ALLISON, ESQ.,......	2.00
W. F. COLEMAN, M. D.,..	5.00	R. PENNISTON STARR, ESQ.,	5.00
G. E. FAIRWEATHER, ESQ.,	6.00	HON. JOHN BOYD,.......	5.00
L. C. ALLISON, M. D.,...	2.00	SAMUEL SCHOFIELD,........	2.00
JAMES A. ESTEY, ESQ.,...	10.00	A FRIEND,..................	1.25
GILBERT MURDOCH, ESQ.,	5.00	R. D. WILMOT, LT. GOV.,	10.00
G. W. WHITNEY, ESQ.,...	5.00	G. U. HAY, ESQ.,.......	5.50

W. F. BEST, $2.00.

STANDING COMMITTEES FOR 1883.

Physics and Chemistry:
W. F. Coleman, M. D. W. F. Best. George U. Hay.

Meteorology:
Gilbert Murdoch. William Murdoch.

Mineralogy:
G. F. Matthew, M. A. W. F. Best. R. Penniston Starr.

Geology:
G. F. Matthew, M. A. W. N. Gould. W. J. Wilson.

Botany:
George U. Hay. Robert Chalmers. James Vroom, (St. Stephen).

Entomology:
M. Chamberlain. Gibson Williamson. Herbert E. Goold.

Invertebrate Zoology:
L. C. Allison, M. D. Mrs. C. E. Heustis. P. R. Inches.

Vertebrate Zoology:
LeB. Botsford, M. D. L. C. Allison, M. D. W. F. Coleman, M. D.

Ornithology:
M. Chamberlain. Harold Gilbert. Jas. W. Banks. F. W. Daniel.
A. Morrisey.

Library:
W. J. Wilson. Robert Chalmers. G. Ernest Fairweather.

Essays:
G. F. Matthew, M. A. W. F. Best. W. F. Coleman, M. D.

Lectures:
Geo. U. Hay. G. Ernest Fairweather. L. C. Allison, M. D.

Publishing:
M. Chamberlain. G. F. Matthew. Geo. U. Hay.

Hall:

M. Chamberlain. Geo. U. Hay. John Hammond. W. J. Wilson.

Finance:

Jas. A. Estey. G. Ernest Fairweather. G. F. Matthew.

Delegate to Royal Society:

G. U. Hay.

Alternative:

M. Chamberlain.

During the year the following names have been added to the roll of

ORDINARY MEMBERS.

February 7.

Simeon Jones,..........Merchant.
W. L. Busby,.......... do.
C. E. Burpee,......... do.
W. F. Bunting,..........Assessor.
Jas. H. Pullen,............Painter.
H. G. Betts,.............Barrister.
R. P. McGivern,..... do.

March 7.

J.W. Williams,....Draughtsman.

April 4.

A. I. Trueman,........Barrister.

May 2.

Master F. B. Ellis.......Student.
Rev. O. S. Newnham, Clergyman.
H. J. Thorne,..........Merchant.
H. C. Preston,........Physician.
S. J. King,..........Postmaster.
W. J. Sutherland,..........Clerk.

June 6.

E. J. Simonds,.........Gentleman.
J. Gillis Jones,............Clerk.
Rev. Irvin L. Beman, Clergyman.

July 4.

R. Keltie Jones,...........Clerk.
D. C. Robertson,........... do.
W. S. Willis,......Ironworker.

August 1.

W. E. Broad,.............Clerk.

September 5.

W. S. Carter,............Teacher.
Thos. Stothart,......... do.

November 7.

Malcolm McKay,.....Merchant.
Jas. Stratton,............Barrister.

December 4.

Edwin Fisher,.... .....Merchant.
W. E. Collier,.............Banker.
R. C. Skinner,...........Barrister.

January 9.

E. H. S. Flood,..........Clerk.

CORRESPONDING MEMBERS.

January 6.

G. H. Burnett,........*Richibucto.*

July 4.

R. C. Weldon,...........*Sackville.*
Gibson Williamson,...*Oak Point.*

August 1.

J. E. Wetmore,.........*Andover.*

September 5.

J. E. Whelpley,........*Hampton.*

October 3.

Gabriel DeVeber,.....*Gagetown.*
L. J. Fowler,......*Washademoak.*

December 4.

R. C. Boxall, C. E.,.....*Sackville.*

Making an addition to the roll of 30 Ordinary and 8 Corresponding Members.

ASSOCIATE MEMBERS.

Miss Bessie Whitney,
Mrs. G. Ernest Fairweather,
Miss M. W. Hartt,
Miss M. A. Peters,
Miss Janet P. Robertson,
Mrs. Ferdinand Pryor,
Miss Sarah Bernard,
Miss Flora McDonald,
Miss Manning Skinner.
Miss Ella Marven,
Miss Emma Christie,
Miss Emily Hartt,
Miss Underhill,
Miss Maud Underhill,
Mrs. Catharine Goddard.

BULLETIN

OF THE

ERRATA.

Page 9, line 36,—for *nucleus* read *nucules*.
" 13, lines 30, 31 and 32,—for *Nos.* and *No.* read *Figs.* and *Fig.*
" 17, line 21,—for *ametiferous* read *amentiferous*.
" 32, " 25,— " *smilax* read *Smilax*.
" 33, " 14,— " *new species* read *species new to the Province*.
" 39, " 30,— " *Ceotrophanes* read *Centrophanes*.
" 40, " 8,— " *Aethyia* read *Æthyia*.
" 41, " 38,— " *swift* read *latter*.
" 42, " 7,— " *New England-Bird life* read *New England Bird-life*.
" 47, " 26,— " *J. H. Thornton* read *J. N. Thornton*.
" 48, " 11,— " *snakes* read *sharks*.
" 48, " 24,— " *Shell Drake* read *Sheldrake*.

by G. F. Matthew, M. A., F. R. S. C. ..
Art. III. *Report of Botanical Committee, with additions to the New Brunswick Flora, edited by G. U. Hay,* ..
Art. IV. *List of the Mammals of New Brunswick, by M. Chamberlain,* .. .. ..

Published by the Society,
ST. JOHN, N. B.
1884.

CORRESPONDING MEMBERS.

Miss Sarah Bernard,
Miss Flora McDonald,
Mrs. Catharine Goddard.

BULLETIN

OF THE

NATURAL HISTORY SOCIETY

—OF—

NEW BRUNSWICK.

NO. III.

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ART. III. *Report of Botanical Committee, with additions to the New Brunswick Flora, edited by G. U. Hay,* ..

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NATURAL HISTORY SOCIETY OF NEW BRUNSWICK

No. III.

ARTICLE I.

CONVERSION OF LIGHT INTO HEAT,

BY LEB. BOTSFORD, M. D.

(Read 27th January, 1884.)

THERE are but few physical facts more definitely settled and accepted, than that of the conversion of motion into heat. So thoroughly is this understood, that, given the volume of matter, and the velocity of movement, the amount of heat envolved from a sudden stopping of the moving mass can be accurately ascertained.

The great cold which exists in the upper air sufficiently shows that the rays from the sun do not produce any sensible rise in the temperature of the atmosphere, and that it is chiefly when the rays of light approach the surface of the earth that heat becomes developed, first in the object against which the light strikes, when indirectly in the air by contact with those substances which have been heated by the sun's rays. Air also may be artifically heated. No doubt can enter the mind but that heat is developed by the action of the direct rays, and man and beast alike seek shelter from its effects in the cooler shades.

Light, we all know, is the result of vibrations in a medium infinitesimal in its tenuity, and passes along with great velocity. If these vibrations should be stopped by any material substance, then they must either cease to exist altogether, or manifest some condition of force which could be stated as their equivalent.

To ascertain what one of the new conditions might be, a few experiments were made, of which I give you the result.

Three glass test tubes were used, each holding about an ounce of fluid. When equally filled, they were first placed in a vessel of water until they all showed the same degree, about 64° F. The air ranged at 65°. The three tubes were then exposed to the direct rays of the sun. One tube was filled with a black solution of India ink. Another with a solution of iodine, the color of brandy; the third with a light yellow fluid.

FIRST EXPERIMENT.

	INDIA INK.	IODINE.	YELLOW.
After the 1st 5m..........	72	69	68
" 2nd "	73	70	69
" 3rd "	74	72	72
" 4th "	76	74	73

SECOND EXPERIMENT.

First tube black, the second blue, from sulp. copper, the third a yellow tinge.

	BLACK.	BLUE.	YELLOW.
5m 1st observation	72	69	68
2nd "	74	72	70

THIRD EXPERIMENT.

	BLACK.	YELLOW TINGE.	WATER.
1st observation	72	70	69
2nd "	75	72	70
25m 3rd "	80	74	72
45 4th "	80	75	74
1.30 5th "	84	76	76

The black tube caused a shadow like any solid substance not transparent, the iodine solution a modified one, and the third still less. In the third experiment, when water was used, the shadow was slight, showing the passage of the light through the tube and water. In the third experiments, the heating of the black liquid was more rapid and decided, and in the third experiment, when one tube contained the ink, the second water, and the third water slightly tinged with yellow, the black tube showed a decided susceptibility.

The conclusion to be drawn from these experiments would appear to be that the absorption or cessation of the light vibrations was the cause of the increased temperature, or in other words the vibrations of light-motion were changed in proportion as they were stopped into a correlated force, namely, heat.

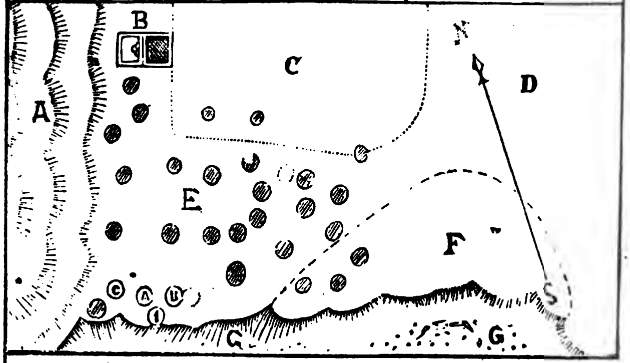
Another experiment was made to test the rate of cooling of different colored liquids.

The three tubes, one of ink and two of water, were placed in a vessel of water heated to 110° F., and when heated up to that point were placed under equal condition. After five minutes all three had cooled down uniformly, and at the end of a half hour all stood at 74° F.

From this experiment it was evident that direct vibrations *from* the black fluid and from water did not differ, and that the cooling took place probably from the *contact* of the tubes and their contents with the surrounding air; that the heat was abstracted chiefly by a medium acting equally upon the tubes; that dark substances or fluids do not radiate more rapidly than colorless fluids, and that the heat does not pass off in the kind of vibrations which constitute light its correlated force, but follows the law of direct contact.

VILLAGE SITE AT BOCABEC

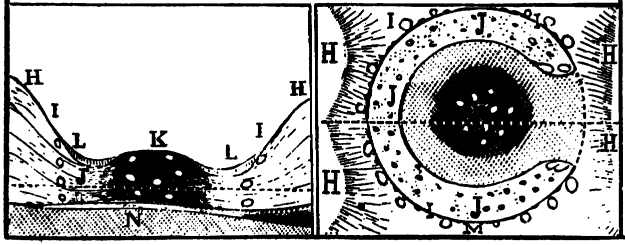
SCALE 80 FEET TO AN INCH.



HUT BOTTOM "A"

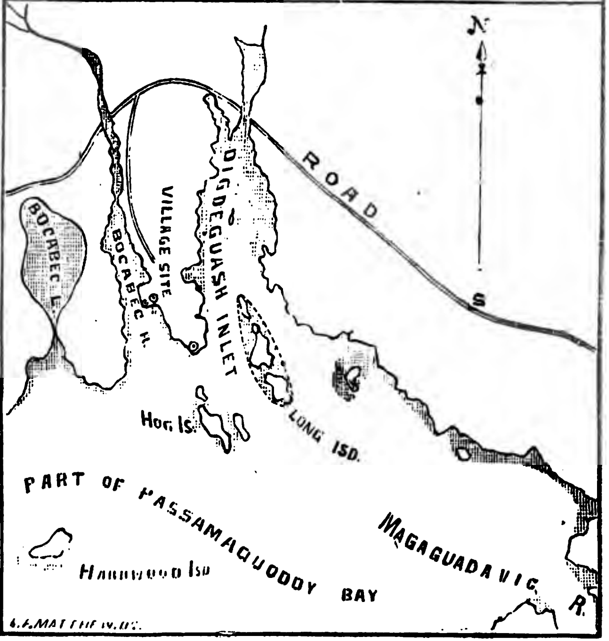
SECTION.

GROUND PLAN



VICINITY of BOCABEC

SCALE 2 MILES TO AN INCH.



ARTICLE II.

DISCOVERIES AT A VILLAGE OF THE STONE AGE AT BOCABEC, N. B.

BY G. F. MATTHEW, M. A., F. R. S. C.

(Read 5th February, 1884.)

A number of the members of this Society combined to form a summer encampment in Charlotte County for the purpose of studying, during a short vacation, the Botany, Zoology and Archæology of the above locality. As the work in the last-named branch of study was entrusted to me, it becomes my duty this evening to tell you of the result of our investigation in the kitchen-middens at Bocabec.

First, however, I may mention that our party left St. John by the Grand Southern Railway on 6th August last, and were joined at our destination by other members of the Society from St. Stephen and from Queen's County.

To the Manager of the Grand Southern Railway we owe our thanks for carrying the party at reduced fare, and for transporting our outfit free of charge; and to George F. Hibbard, Esq., and Mr. Alexander Boyd, for much kindness and attention during our stay in St. George and at Bocabec.

DESCRIPTION OF THE VILLAGE SITE AND ITS SURROUNDINGS.

The spot chosen for investigation was a group of kitchen-middens or shell heaps which mark the site of an abandoned village of the Stone Age at a place called Phil's Beach, near the mouth of the Bocabec River. The site was well chosen, for the advantages of the place are manifold to a people who depended for existence on hunting and fishing. A clay flat, (C, D, E, F,)* flanked on the west by a long projecting hill of felsite rock, running parallel to the course of the Bocabec River, was the spot chosen for the principal settlement. On the east a similar ridge separates the flat from Digdeguash Inlet. To the north of this clay flat, where there is now an open field, the standing forest broke off the keen winds of winter ; and to the south was the sea-beach, where drift wood in abundance was thrown up, and where boats or canoes could be kept, secure from the rising and falling tide.

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* The letters refer to the woodcut "Village Site of Bocabec," on opposite page.

The tide rises from twenty to twenty-five feet at this place; and as the lower half of the beach is stony, it is probable that the savages who dwelt there obtained their principal supplies of shell-fish at some other point. A sandy beach, and therefore one more suitable for clams, exists on the river about half a mile further up than Phil's Beach; and extensive sand-flats abounding with these bivalves are found around the shores of Hog Island, off the mouth of the Bocabec River. These sands, below the surface, are black with accumulated organic matter, resulting from the decay of marine animals (clams, etc..) and would be valuable as a fertilizer of the clay fields found in the valleys along these shores. Sea-fish and marine animals no doubt abounded then, as now, along the whole of this river. Herring and other fish are now taken in great quantities in the weirs at the mouth of the Bocabec.

The position of the aboriginal settlement at Phil's Beach was also very advantageous for hunting. The inhabitants of the village could float up with the tide three miles, to the head of navigation, whence they had a five mile range for hunting beaver and larger game on the branches of the Bocabec River; or by going out of the river and passing into Digdeguash Inlet, a still more extensive woodland tract was open to them. From the mouth of the Bocabec they could also cross Passamaquoddy Bay in various directions in search of seals and sea-birds.

The position of this village was well chosen for defence. Its inhabitants appear to have had an outpost at the point on the eastern side of the entrance to the Bocabec River, whence a view could be had of all canoes approaching from the Digdeguash or Magaguadavic River, or the more open part of the Passamaquoddy Bay. Another section of the settlement occupied a small beach on the Bocabec River a little further up than Phil's Beach, and thus guarded the northern approach to the village.

To the east of Phil's Beach a spring of cool water flows over a low cliff into the sea, and would have given an unfailing supply of this necessary liquid to the inhabitants of the village. In the swale (D) to the east of the village site, now cleared but then probably wooded, a further supply of water was available.

Such was the general relation of the village of Phil's Beach to the surrounding country. A few words may be added as to the arrangement of the dwellings of which it was composed. On first surveying the ground, it was observed that the north side of the village site (C) was comparatively smooth, having been under cultivation since the arrival of the English, and no inequalities remained that would indicate where the dwellings of the ancient inhabitants had been. On this smooth ground we pitched our tents, and found it admirably adapted for our purpose, being well drained by the layers of shells beneath. Fully one-half of the site of the village, however, including the part on which the shells of the kitchen-midden were heaped together in the greatest quantities (C), had never been disturbed by the plow. Here the ground was covered with a growth of the Cow Parsnip (*Heracleum lanatum*), intermingled with other coarse weeds and grasses. This herbage extended to the extreme limits of the village site except, on the north, where the land had been brought under the plow. In the western part of the shell covered area, where the heaps of shells were most conspicuous, the presence of numerous saucer-shaped depressions indicated the positions of the huts of the aboriginal settlement. Over the greater portion of this uneven area no order or arrangement into regular streets could be observed. But near the sea beach, on the southern side of the village site, there was an approach to regularity in the position of the hut bottoms. The front row of huts (A,B,C, etc.) appears to have been the favourite section for dwellings. Not only were the foundations of the huts more closely set in this row, but the refuse heaps both before and behind them are larger than elsewhere. The huts of this row are very closely set, with alley-ways between, in some cases only four feet wide; but the spaces between the huts further back are greater. Such at least was the arrangement of the huts in the later years during which this community existed. Not only were the huts more scattered in the rear part of the village, but anything like a systematic arrangement in rows entirely disappears after passing the third row from the front of the village.

Of the depressions marking the hut bottoms of the front row, which as I have said, were more closely placed than those further back, one was much longer and deeper than the rest. This, at first sight, gave the impression of a long communal dwelling, and here we determined to begin our exploration. In digging a trench through a part of this depression we struck an ancient fire-place, which was made the centre of exploration for several feet around. It was found that at this point the deposit in the hut bottom was about two feet deep, but its fire-place rested on an older kitchen-midden, or refuse-heap beneath.

HUT BOTTOM NO. 1.—ITS ANTIQUITY.

The hut bottom of which the first named fire-place is the centre is distinguished on the plan as hut bottom A. The older shell-heap beneath (marked No. 1) differs in several respects from that of hut bottom A; there was much less charcoal mingled with the shells, and fish-bones were more plentiful. When also we had traced this lower kitchen-midden in different directions beneath and beyond hut bottom A, we found stone chips or flakes, which had been struck off in the manufacture of weapons, differing in kind from any that were met with at the higher levels. The weapons found in the lower kitchen-midden were also larger, coarser, and of a different form from those exhumed from the hut bottom and waste heaps of A. Fragments of bone harpoons were more plentiful at the lower horizon, the pieces of bone more fragile, and the stone chips more abundantly coated with carbonate of lime than at the higher levels. There were also differences in the patterns of the pottery found in the two deposits. The ornamentation of the fragments of pottery found in this lower kitchen-midden was made with a pointed instrument having a smooth round point, but that of all the pottery obtained from the higher levels was impressed with a tool having a square or angular point,—all seemed to point to a want of continuity in the arts and habits of the men of the older kitchen-midden, and those who made the shell-heaps and occupied the hut bottom of A; and it seems possible that the former belonged to a different tribe or race from the latter.

I am the more confirmed in this impression that there was an older and independent occupation of this camping ground, from the discovery near the edge of the bank overlooking the sea beach, in and beneath the oldest kitchen-midden, of an ancient fire-place, so situated that it must have belonged to a hut whose foundation has been partly swept away by the sea; and which was therefore erected and occupied when the bank extended further out than it does now, and also further out than when the inhabitants of hut bottom A lived there. This older fire-place is marked on the plan as hut bottom No. 1. It was planted on a fresh layer of gravel apparently spread over the original land surface by a storm or by the surf when the land was lower than it is now, as the gravel fills up the inequalities between the stones which are scattered over the clay flat. There was but a film of vegetable mould between this gravel and the clay, from which it may be inferred that hut bottom No. 1 marks a very early occupation of the site. The clay upon which the layer of gravel was spread, is the Leda or Champlain clay of geologists ("N" in section of hut bottom), and it does not seem likely that a very long time elapsed, after this portion of the land was raised above the sea, before it was occupied by man.

The foot-hold thus obtained at the sea-side by the dwellers of hut-bottom No. 1 seems to have been precarious, and when their successors came they placed their camps further back, and found a permanent site, safe from the encroachments of the sea.

HUT BOTTOM A—ITS FORM AND THE HABITS OF ITS OCCUPANTS.

As I have already remarked, the site of hut bottom A and its associated dwellings had on the surface the appearance of a communal dwelling, which was eight feet in breadth by thirty long. As our explorations progressed it was found that this oblong depression did not mark the foundations of a single hut but of several placed close together in a row. The exact form and size of the typical hut was disclosed by a layer of clean beach gravel, which we met with about fifteen inches from the surface (J). This layer formed a ring around the fireplace, at a distance of from two to three feet from its centre, and was bordered all around by the shells of a kitchen-midden (H). The ring of gravel was about three inches thick in its deepest part, and was continuous except on the south side, where a break about four feet long marks the position of the door. Here the ends of the gravelly layer were upheld or bounded by a few large stones.

This gravelly stratum was found to form the boundary of a hut bottom, less than one-third of the length of the whole depression occupied by the row of hut bottoms; the hut bottom had a diameter of eight feet. Around the margin of this foundation there were imbedded stones (I) of various sizes that appear to have been used as supports or wedges for poles of which the frame work of the hut was composed. No remains of these poles or of any wood work was discovered which could be referred to the time when this village site was occupied by an aboriginal people.

There are two peculiarities in the foundation of this hut which would lead to the inference that the hut was conical. The first is the relation of the kitchen-midden to the gravel of the sleeping-bench. In making a trench through this hut bottom, and others adjoining, sections of several layers of gravel marking such sleeping-benches were passed through at various depths in the deposit; and in all, the outer edge of the gravel of the sleeping-bench was found to be overlapped by the shells of the kitchen-midden, as though the shells had fallen in upon the gravel after the decay of the poles which had supported the walls of the hut. This overlapping of the shells might, however, have been caused by the heap of shells outside the hut growing more rapidly than the *debris* accumulated within it; and then on the decay of the walls of the hut these shells would fall in on the gravel of the sleeping bench. A second feature in the appearance of this foundation, which seemed to indicate a conical form to the dwelling, was the width between the ends of the gravelly layer of the sleeping-bench of hut bottom A. If this space corresponds to the width of the doorway it would be quite out of proportion to the size of such a dwelling, unless the doorway was rapidly narrowed above by the convergence of the poles supporting the sides of the hut.

The careless habits of the old Neolithic people who dwelt on the shores of the Bocabec were quite noticeable, and certainly were favorable to the spread of disease among them. I have said that they underlaid their sleeping banks with gravel, and in this practice they shewed their appreciation of the comfort of a dry bed. This couch they no doubt made softer by covering it with boughs, and warmer by the added luxury of fur-skins. Nevertheless, in some respects they were exceedingly slovenly. The ashes and charcoal of their fire-places (K) gradually accumulated to such an extent that to level up the sides of their huts they brought in gravel and threw it on the trampled clam shells and other fragments of their feasts that were scattered over the floor. They were too slothful to clean out the smaller fragments of bone, etc., and so it happened that in the course of time the stones around their fire-places, which were used to support the firewood and the pots, were gradually buried up, and fresh stones had to be brought in to raise the wood above the embers and to support the cooking vessels. If the occupants of a hut were careless enough to break a pot, it was more than probable that the fragments would be allowed to lie on the floor and be trampled under foot, until buried out of sight among the *debris* scattered around the fire-place. The bones left after dinner received much the same treatment. When the flesh was eaten off the leg-bones, they were broken up for the marrow they contained, and, with the smaller bones, were left scattered around on the floor, or perhaps the larger fragments would be flung carelessly out of the door and left to fester in the sun. Occasionally a fit of house-cleaning would seize upon the occupants of one of these huts and the fragments lying within on the floor would be scraped together and shovelled out at the door to mingle with the heaps of shells and broken bones without. The evidence of these actions on the part of the inhabitants of hut A is found in the frequently alternating layers of charcoal mingled with broken bones, of pottery clay and other refuse from the hut, which are found in the kitchen-midden before the door (H). These occur with considerable regularity and frequency, in alternation with layers of clam shells which form the bulk of the shell heap. Owing to these occasional house-cleanings, and the vast quantities of clam shells thrown down around these dwellings, the kjokken-modding increased much more rapidly than the deposits within the huts; and although fresh material was frequently brought in to level up the interior of the huts, the boughs and perishable matter within gradually decayed away and the floors sank down, so that now the depth of the deposit within the site of the huts is only about half as great as that of the shell heaps without.

The fire-place (K) of this hut was found to have been kept in the same spot from the time the hut was first built, almost until the settlement was abandoned. Such, however, was not the case with an adjoining hut bottom (B), which was gradually shifted to the east, so that at the close of the occupancy of this village site it was about two feet from its original position. A similar want of permanency in the position of the individual hut was found to exist in other hut bottoms. The huts, therefore, must have been re-built from time to time, and perhaps were deserted for a part of the year.

There seems, however, to have been sufficient permanency to these hut bottoms to warrant the assumption made in a preceding page, that each saucer-shaped depression in the kitchen middens of this village marks the site of a hut.

From the present aspect of the surface of the kitchen-middens at this village site, a rough approximation to the population of Bocabec River during this latter part of the

Stone Age may be obtained. In that part of the higher portion of the main village site which still remains undisturbed by the plow, there are depressions marking the position of about thirty hut-bottoms. Allowing four individuals to each hut, there would be in this part of the village a population of about 120. But behind this part of the village, which has been ploughed over, there is an area of about equal extent covered by shells; and an additional tract of about the same size, more or less covered by kitchen-middens, lies to the east of the higher part of the village site. At times, on the basis above given, a population of 300 may therefore have lived at the main village at Bocabec. But it is probable that half this number would be nearer the ordinary population of the place.

It appears to have been the practice of the women who dwelt in hut A, to stow away their needles, pins, and other articles of use or adornment at the back of the hut, and here they would occasionally slip down and be lost between the couch and the poles and stones of the outer wall. Several of the bone implements taken from this hut bottom were found in such places.

MANUFACTURE OF POTTERY.

One of the occupations of the women living at Bocabec was the manufacture of pottery. On the western side of hut bottom A was a pottery-yard, or place of deposit, where the occupants of this hut kept a supply of clay for the manufacture of pots and earthen vessels. These people had ready to their hand, in the flat of land which they had chosen as a site for their village, a good tough clay, well suited for making pottery, when mixed with a due proportion of sand. Nevertheless, they do not appear in any case to have used it, but took the mud of the sea-shore, near low-tide mark, for the manufacture of their ware. Such I infer to have been the case, for in the course of our excavations we came across patches of pottery clay in various spots, and at several levels in the hut bottoms A, B, and C, and kitchen-middens adjoining them, and in all cases the material thus used was beach-mud, mingled with numerous shells of mussel and clam. In preparing this mud for use, these women of the Stone Age picked out the coarser stones and gravel and many of the shells before moulding and baking their pots. But in consequence of the imperfections of the material used as the basis of their pottery, and the very imperfect firing to which the ware was subjected, it was exceedingly fragile. The coarseness of the clay used in the manufacture, as well as these defects in the material, and the imperfect baking, compelled these potters to make their ware quite thick, in order to obtain the necessary strength. Their vessels were seldom less than three-eighths of an inch thick in any part, except near the rim, and the bottoms were usually about half an inch thick. As I have already remarked, the women appear to have been slovenly in their housekeeping, and as an added instance of this trait I may mention that the charred remains of their pottage still clings to the fragments of their vessels. In the fine charcoal and ashes around the fire-place of hut bottom A were found numbers of parched peas or vetches and of a round seed of the size of those of the radish, as well as grains apparently of some kind of grass. The peas were about the size and appearance of Beach Peas (*Lathyrus maritimus*, Big.), a plant which now grows plentifully at high-water mark on the beach in front of the village site.

But while animadverting upon the carelessness these people in some respects, it is only just to give them credit for a considerable amount of rude taste in the ornamentation of their pottery. Upon the fragments found at the three hut bottoms we examined there are no less than ten distinct designs or patterns impressed upon the surface of the ware. Some of them are quite ornamental. A favorite style of ornamentation consisted of continuous parallel lines made with pointed tools ; but a more elegant pattern was a chevron, consisting of rows of short diagonal lines impressed in this manner. We did not meet with any of the tools by means of which these patterns were impressed upon the pottery. A small implement with a square point seems to have been in common use, and another is indicated with several teeth by which certain rows of scolloped indentations were made, The lips of several of the vessels were ornamented with diagonal rows of indentations apparently made by an implement having three teeth.

Some of the patterns indicate a different process of manufacture from the last: these show the print of a coarse woven fabric on the outside of the vessel, and sometimes also within. On some fragments this pattern has the appearance of a fine basket work, and may have been used to preserve the form of the vessel, as well as to ornament the surface. On other pieces of the terra cotta the pattern very closely resembles that left on bread by the coarse osnaburg used by bakers to cover their dough. Fragments of another pot were found which bore the impression of flattened bunches of grass or rushes.

One pattern of the class first referred to, consisting of square, incised dots, is precisely like the marking on some fragments of pottery which I met with about fourteen years ago at Oak Bay, on the western border of Charlotte County. A fragment of pottery found at Bocabec bears the imprint of a leaf of the fir tree (*Abies Americana*) that had been incorporated with the clay of the vessel before baking. It is not probable that this little leaf was in the clay when taken from the mud-flat of the Bocabec River, for being light, such a leaf would have floated on the water and been stranded near high tide mark. We can imagine that it may have fallen from a neighboring tree, or have stuck to the clay when it was thrown down beside the hut. Here we may fancy the crouching potter unconsciously kneading it in as she prepared her clay, and gave form and beauty to her work; little thinking that she thus gave permanency to the outlines of a little leaf which perished ages ago; or that she was adding another line to the history of her people.

Some of the patterns on the fragments of pottery from Bocabec are very like those on the sherds obtained by Dr. L. W. Bailey at the thoroughfare of Maquapet Lake; but the designs are not so elaborate; yet, there appears to have been much in common between the men of the river and those of the sea shore, in this art, as well as others.

In the relative culture of the river Stone-men of Acadia and those of its sea coast, we seem to have a parallel to that observed in Denmark by Prof. Steenstrup between the weapons and implements of the men who erected the tumuli and those who left the Kjökken Mödding in that country, but the differences between the work of the inland people and those of the sea shore in Acadia do not appear to have been of so marked a character as that between the work of the corresponding populations in Denmark. We have as yet, however, but small collections to test this point, but I may mention incidentally that some of the skin scrapers from the St. John River exhibit a high finish, and are equal to the most perfect figured by Evans, as found in the barrows of Britain.

IMPLEMENTS AND WEAPONS OF STONE.

Though their pottery was coarse, the people of Bocabec showed a great degree of proficiency in another art, namely, the manufacture of implements of stone.

This industry we may suppose was in the hands of the men, and some of the implements obtained show that it was brought to great perfection.

If Longfellow was right, this work was carried on by the North American Indians outside of the hut. The poet's graphic description of the arrow-maker of the West, sitting by his hut door and meditating upon the exploits of former days, is well known. I cite it, as I think it will be seen that his habits did not in all respects agree with those of the arrow-maker of the Stone Age in Acadia.

> "At the doorway of his wigwam
> Sat the ancient Arrow-maker,
> In the land of the Dacotahs,
> Making arrow-heads of jasper,
> Arrow-heads of chalcedony." . . .

Truth, however, compels us to declare that the arrow-maker of Bocabec conducted his operations chiefly within doors. Nor do I suppose that he worked within the hut on account of any special secret in the manufacture, but for other reasons that I will endeavor to explain further on. By far the best work in this line of art at Bocabec was found within hut bottom A, where the chipping of the lance and arrow-heads was performed beside the fire-place on stones or supports placed near the fire. The flakes resulting from the manufacture of these implements were very plentiful in this part of the hut bottom. Very few flakes were found outside the hut, and these mostly beside stones used for wedging the poles of the frame-work that supported the covering of the hut. In the kitchen-midden, flakes are quite rare. It would, therefore, appear that the arrow and lance-heads were fabricated beside the fire-place, and apparently at times with the help of the fire-light, for the flakes were more abundant at the sides and back of the fire-place than in the front. The lance-heads were flat, and of a long oval pattern; a narrower and thicker point, of which one example was found, was probably a javelin-point; and another that was triangular and barbed at the base, would be regarded as a spear-point. All the weapons of this type that we met with were made of petrosilex or a highly quartzose felsite, and most of the arrow-heads were fabricated from these rocks, but we found a few that were made of quartz and jasper.

The arrow-points were chiefly of three patterns, viz., lozenge-shaped, lanceolate leaf-form and triangular, with lateral notches for securing the point to the shaft. Many of these arrow-points were rudely made, others more highly finished. The workmanship on one of the triangular, notched arrow-points of petrosilex rock could not be surpassed. It was finely serrated on the edges and had a fine tapering point. Another arrow-point of laurel-leaf form made of quartz was also quite symmetrical.

There was a remarkable scarcity of axes and of the larger stone implements at these hut bottoms. Only one well-formed axe was found, and this was in the kitchen-midden under hut bottom B. A very large, ovate, lance-head of quarzite accompanied this axe. In this lower kitchen-midden, which is connected with the hut bottom No. 1 already referred to, there were many flakes of a dark brown petrosilex of coarser grain than the black petrosilex from which many of the weapon-points of the higher kitchen-middens and hut bottoms were made. Quartzite rock was more largely used in the manufacture of weapons by the inhabitants of hut No. 1 than by the men who subsequently occupied the place.

Some rougher axes and hammer-stones were found. These larger implements for rough work were chiefly made from diorite or quartzite, rocks better suited for standing heavy blows than the more fragile petrosilex and quartz.

Among the objects from Bocabec are a number of skinning knives. Those which showed the most careful chipping were rectangular in outline, like some agate knives found on the St. John River. Several, however, were lunate or oval. The material used in the manufacture or these knives was either quartz or petrosilex, mostly the former. Numbers of stone flakes, chiefly of petrosilex, which had the form of rude knives, were found. Some of these, in their worn edges, gave evidence of having been used for cutting. These flakes are of various forms, some approaching scrapers in appearance, others are simply sharp flakes which do not appear to have been applied to any special use. The skinning-knives were made of quartz and petrosilex, but a large majority of the knife-flakes were formed of the latter rock. Quartzite knife-flakes were comparatively scarce, and came mostly from the shell-heap of hut bottom No. 1.

The most curious stone implement found at Phil's Beach was one obtained by Mr. Alexander Boyd, the proprietor of the place. This implement was unearthed from the kitchen-midden behind hut bottom A by Mr. Boyd, when he was removing shells to spread on his land. It consists of petrosilex rock, and in form resembles a short femur of a large reptile; it is smoothed by rubbing at each end, and may have been used as a slick-stone for softening skins.

Other stone implements of a long oval form, which from their appearance are supposed to have been used as slick-stones, were found at hut bottom A. Here also we met with a long cylindrical stone which had probably been used as a pencil, for small facets have been formed on the end of it by rubbing.

Scrapers in great numbers were found in the hut bottoms of this village site, but they were as imperfectly made as they were numerous, and none were met with that possessed the artistic finish of the agate scrapers found on the shores and tributaries of the St. John River.

Though thus lacking in elegance, the scrapers found at Phil's Beach, Bocabec, present a variety of forms, and were no doubt intended for various uses. Beside the ordinary scraper, which in form may be compared to a gun-flint with rounded corners, and which was used for dressing skins, there were several kinds that were probably used as carpenters' tools. Some of these had chisel-shaped extremities, and, secured in a handle of bone or horn, would have made very serviceable little chisels. Other gouge-pointed forms would have been useful implements for scraping the insides of hollow bones, such as are found shaped into needles, bodkins, etc. In others the outline of the scraping edge was concave; these would have been suitable for scraping the wooden shafts of arrows or any other rounded surface of wood or bone. It was in hut bottom C that the greatest variety of these implements was found.

As hut bottom A was characterized by the variety and perfection of its stone weapons, so hut bottom C, by the presence of numerous scrapers, gave evidence of the operations of the artificer in wood. Quartz, being a harder stone than petrosilex or felsite, was the favorite material for scraping tools; but many of the scrapers made of this rock were merely rough flakes, to which a fresh edge was given by flaking minute chips from the margin, and the tool thus restored was used again. This habit of the men of Bocabec reminds us of the manner in which window glass is now used by cabinet makers for similar purposes, a fresh edge being obtained by breaking the glass, when the old one has become dulled by use.

By far the greatest number of scrapers were made of quartz; but beside those made of petrosilex (and these were numerous), there were a few of agate, jasper and chalcedony. No veins of agate or chalcedony are known to occur near the Bocabec River, but these minerals could have been procured at Grand Manan Island to the south, or on the St. John River to the north. Two scrapers made of these varieties of quartz shew a remarkable amount of weathering, as though they had been in use for a long time.

The source of supply for the material from which the greater part of the stone weapons and implements of Bocabec have been fabricated is not far distant from the site of the village. The whole northern and eastern side of Passamaquoddy Bay is bordered by trap rocks and sedimentary rocks which, from the fossils found in the slates at the base of the series, are regarded as Upper Silurian. The lower part of this formation with marine fossils, which in the Reports of the Geological Survey of Canada are described as Division 1, are absent from the outcrops about Bocabec, which expose at the base of the terrain, Division 2. This part of the terrain which, in the most southerly outcrops in Charlotte County, consists of hardened silicious shales, is represented at Bocabec by a fine-grained petrosilex, exposed in Digdeguash Basin, and probably also on Bocabec River. This rock splits with a deep conchoidal fracture, and is capable of being worked like flint or chert into stone weapons. It is this material which the men of Bocabec found most advantageous for the fabrication of lance and arrow-heads.*

In the Third Division (Div. 3) of the Silurian series of rocks, flaggy sandstones are common on the southern margin of Passamaquoddy Bay; but at Bocabec, which is at the head of the same Bay, this number of the series is found to be very compact and fine-grained, coming under the the denomination of quartzite. This rock has been used to some extent by the dwellers of Bocabec for their larger weapons and implements.

A third rock, or rather mineral, quartz, was one of which the men of Bocabec availed themselves to a large extent in the manufacture of stone weapons. As this mineral occurs abundantly in the pebbles of the drift and other surface deposits of the region, it is plentiful on the sea beaches, which abound with stones washed out of these surface deposits, and no special source of supply need be looked for.

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*This rock is sometimes called hornstone; it is not however a hornstone which is a splintery or flint-like variety of quartz, but it is a fine grained, siliceous, sedimentary rock, baked or hardened. It differs from felsite, which develops numerous joints when weathered, and so is unsuitable for flint implements.

From the fact that many of the rocks and minerals used by the community of Bocabec for weapons and implements were found so close to their homes, we have good reason to suppose that there was very little occasion for these men of the Stone Age to seek them elsewhere by barter.

IMPLEMENTS OF BONE AND IVORY.

Bone implements of various kinds were found both in the hut bottoms and in the kitchen-middens, but mostly in a fragmentary condition. The most abundant were bodkins of a rough type. These were made in most cases by pointing split pieces of the leg bones of moose, deer or other large animals. An implement like a bodkin in form, but hollow, and having a slit sawed or cut at the smaller end, was made of the leg bone of a bird. Not knowing the use of this implement, I sent it to Dr. Daniel Wilson, of Toronto, for examination. He thinks "it may be assumed with much probability that it is a modelling-tool, such as the Western Indians still use in the fashioning and ornamenting of their finer pottery."

Several fragments of netting needles, or implements which for their size and form appear to have been available for this use, were found, and one perfect needle of this kind, about eight inches long, was met with. It had one eye about the middle; another broken needle had two perforations. Many fragments of channelled bone implements, which appear to have been pieces of needles and bodkins, were exhumed from the hut bottoms. The harpoons were of the ordinary form, with lanceolate point, and barbed on one side. Only fragments of this kind of implement were obtained.

Among the worked bones which are not, strictly speaking, implements, there was one which was scored on the back, and another that was notched on the edge. Such bones may have been of the nature of tally-sticks; but Dr. J. W. Dawson suggests that objects of this kind, which are also found among the ancient relics in European caverns, may have been used for playing games, small pieces of wood, ivory and bone being carried about by the Indians of British Columbia at the present day, and used like playing-cards.

Of ivory implements the only ones found were made of the tooth of the beaver. By cutting the point of the incisor of this animal in various ways, chisels, gouges, and other pointed implements were formed. These would be used where the material to be operated upon was not too hard, and such implements were more easily made than the quartz scrapers or tools.

ANIMALS USED FOR FOOD.

In our operations at Bocabec a great many bones and fragments of bones of various animals were unearthed. I have not yet had time or opportunity to have these determined, but it is certain that quite a number of species are represented. The beaver is perhaps the most abundant, for the lower jaw and the femur of this animal were constantly turning up in our excavations. The leg-bones of moose and of deer or cariboo (reindeer) were also of frequent occurrence, but were almost invariably broken to pieces for the marrow. The hare, the fox and the bear were indicated by teeth, jaws and limb-bones. Bones of birds are frequent, and represent those of wading, aquatic, and arboreal habit. A number of bones, which from their spongy texture are supposed to be those of marine animals, were found. Fishes are represented by remains of the cod, herring, sculpin and shark.

But the remains which form by far the greatest mass in the kitchen-middens at Bocabec are those of *shell-fish*. Among these, pre-eminence must be given to the clam (*Mya arenaria*), which makes up perhaps nine-tenths of the bulk of the molluscan refuge.* The horse-mussel (*Modiola modiolus*) and the long-whelk (*Buccinum undatum*) are the most numerous of the other molluscs found in the refuse heaps of this village. After these species may be named the round-whelk (*Lunatia heros*) and the small purple-shell (*Purpura lapillus.*) The rock-periwinkle (*Littorina rudis*) is occasionally found, and so also is the bonnet limpet (*Crepidula fornicata*); but the common European periwinkle (*Littorina litorea*), now so common on this coast, is entirely wanting. Beside these, a single valve of the large scallop (*Pecten tenuistriatus*) was found.

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* The following paragraph from the St. Croix *Courier* (1892), published at St. Stephen, N. B., is of interest in connection with the great abundance of the shells of this mollusc. "Mrs. Brown [Mrs. W. Wallace Brown, of Calais, Me , whose husband was formerly Indian Agent] has been told by the Passamaquoddies that the shell heaps were left by their forefathers ; who, they say, made autumn encampments on the shore, for the purpose of getting a winter supply of clams. They chose a spot from which it was easy to get back to their winter hunting grounds; therefore the shell heaps are usually found near the mouths of navigable streams. The clams were put in an oven, and cooked just enough to be taken out of the shells easily; and were then dried on sticks. This preserved them and made them light and easy to carry. Several households they say used the same oven, which accounts for the great number of shells in one place The saltness of the clams made them an important article of food; as salt was unknown in its crystalline form." [It is evident however, that the men of the Stone Age did not visit Bocabec solely for the purpose of laying in a store of smoke-dried clams.—G. F. M.]

The sea urchin is present, but may have been introduced accidently by crows, and not have been brought intentionally from the beach by the former residents of Bocabec. Other posthumous or accidental additions to the fauna are the land snails, of which several specimens were found at various levels in the shell heaps. Among the species found here, *Helix alternata*, Say, is by far the most abundant. *Helix albolabris*, Say, was not very common. Several specimens of *Helix hortensis*, Müll., were observed, but this species has probably been introduced since the arrival of the English. A species was found which agrees with Binney's description of *Helix Sayii*, except that the tooth on the parietal partition is nearly obsolete. Among the smaller snails were *Helix monodon*, Rack, *Hyalina arborea*, Say, *Hyalina multidentata*, Binn.

Vanity is a foible quite as prevalent in savage as in civilized communities, and we are not surprised to find indications of it among the dwellers at Bocabec. Among the *reliquæ* of their hut bottoms was a fragment of a stone pendant decorated with crossed lines in the form of a lattice, and two kinds of powder, which appear to have been kept in valves of the common clam. One of these powders is made from galena ore, small veins of which occur on the islands of Digdeguash Inlet, near Bocabec. The powder has a glistening appearance The other powder, which was formed of pulverized shells of the horse mussel, could have been used as a white paint. These powders would appear to have been a part of their toilet requisites. That such has been the use of the glittering galena seems highly probable; and Darwin, in his account of the native Fuegians of South America. who subsisted on a diet similar to that of the Stone men of Bocabec, records their appearance as follows: "These poor wretches were stunted in their growth, their hideous faces *bedaubed with white paint,* their skins filthy and greasy, their hair entangled, their voices discordant, their gestures violent, and without dignity."

PERMANENCY AND ANTIQUITY OF THE VILLAGE.

It has been thought that these kitchen-middens around the shores of Passamaquoddy Bay were made by a people who camped along the shore in summer for fishing and hunting, but retreated inland to the shelter of the woods in winter. There are, however, indications that the occupation of the village sites marked by these shell-heaps was more or less continuous.

Among the indications of occupancy at other seasons than the summer, I may refer to the kind of clay used in their pottery, and the places in the village where deposits of this clay were found. In making sections of the three hut bottoms at Bocabec we passed through several layers of pottery clay of small lateral extent, which had evidently been scattered on the floor of the huts. So also in the kitchen-midden in front of hut bottom A, irregular layers of the same kind of clay were traversed. These layers were mingled with the charcoal and refuse that had been cast out from the door of the hut in such a way as to show that all had come from within the hut. I think, therefore, there can be little doubt that the moulding of the pottery was sometimes carried on within the huts. The practice of chipping their flint implements within the hut, to which I have already referred, would also indicate the use of these dwellings during the colder part of the year.

The very fact of these savages using only the mud of the beach in the manufacture of their pottery, seems to show that the work in terra-cotta was carried on mostly in winter, when other and better kinds of clay (for no other kind has been found in the sherds collected at Bocabec) were inaccessible to them.

The position of the encampment also, situated as it was on the edge of an open beach facing the south, and sheltered from the north-west and north-east winds by protecting ridges of land, was well adapted for a winter residence.

With our very imperfect knowledge of the shell-heap folk of Passamaquoddy Bay and of the remains they have left, it would be premature to say how long these kitchen-middens have been lying in their present condition, or when the various village sites marked by accumulation of these remains were abandoned. It may, however, be worth while to mention a few points bearing on the question of their age.

Among all the weapons, implements, and other objects found at Bocabec, not one article has been met with which in any way would lead to the supposition that these people were acquainted with the products of European industry. Mr. W. F. Ganong informed me that at a group of kitchen-middens at Chamcook, near St. Andrews, not far from the spot where De Monts wintered with the first colony of Europeans who attempted a settlement in Acadia, an iron-bound copper kettle had been found. I am not aware of the conditions under which the discovery was made. No trace of any object formed of metal or glass was detected at Bocabec. The stone weapons and implements were made of material occuring on the Bocabec River, or in its neighborhood, or at least not farther off than the St. John River. Two of the scrapers, one of chalcedony and the other of agate, shewed quite a deep weathering and must have been for a long time exposed on the surface of the ground. Nevertheless, the tools of felsite, which are more easily affected by the weather, do not give indications by the condition of their surface of very great antiquity; and the two scrapers of chalcedony and agate may have been the implements of an earlier people found and used by the latter dwellers at Bocabec.

An inference regarding the antiquity of this village site may also be drawn from the covering of vegetable mould which has gathered on the surface of the shell-heaps to a greater or less depth in different places. In the hollows, and especially over the hut bottoms this mould has attained a considerable depth, in some places as much as a foot or eighteen inches.

But while on the one hand these conditions point to a period anterior to the discovery of America, or at least of the region of Acadia, by the "White Race," as the time when the shores of the Bocabec ceased to be occupied by the people whose remains we have examined; on the other hand, their sojourn on its banks, when compared with the whole length of the Stone Age, was both recent and short.

In the Old World, the Stone Age has been divided into two great periods — the Palaeolithic, or the time when mankind used implements and weapons of chipped stone only, and the later Neolithic, when weapons of ground stone were also employed. The length of time embraced in the earlier of these periods is very great. Since its beginning the river valleys in Western Europe have been very much deepened, and the courses of the rivers in some cases changed. Man, who at first hunted the Siberian elephant, the rhinoceros, the cave bear and other large animals now extinct, used at first large and roughly made axes of chipped stone. Subsequently he found his large game chiefly in the horse and reindeer, and the stone-pointed spear became more prominent as a weapon of offence. In later times, but still while using no stone implements but those made by chipping, he hunted various wild animals more nearly like those which existed in Europe in the times of the ancient Romans. His weapons now were made smaller and lighter. Such in outline was the condition of man in the Palaeolithic Age.

The Neolithic period of Europe, or the time when man in that region used weapons of ground and polished stone, is of a later date than the Palaeolithic times I have glanced at.

No such continuous history of man in America is yet known, for the subject is only now receiving the attention which has been bestowed upon it in Europe for many years, and the landmarks of the older civilization of the Old World seem to be wanting in the New. When the American Indian of this region first became known to Europeans he was still in the Stone Age, but his weapons and his arts were such as to show that he had arrived at a condition of culture equivalent to the Neolithic Age of the rude inhabitants of Europe. Discoveries have, however, lately been made which make it highly probable that there was an older and ruder age in America as well as in Europe. Dr. Abbot, the pioneer in this line of research, has found in the gravel terraces along the Delaware River at Trenton in New Jersey, rude stone implements which far antedate the occupation of that region by the tribes known there when the continent of America was discovered. Most of the objects found were very rudely chipped, and belonged to a people of very primitive habits. Within a year or two a similar discovery, consisting however of stone chips only, was made in the terraced deposits of Central Minnesota.

With such buried remains of man's occupancy of the earth our Bocabec relics do not compare, as they rest upon the surface, and are unquestionably less ancient. I have already referred to some of the geological evidences of the recent accumulation of these relics, but I may mention other features which stamp these remains as those of a recent Neolithic people. At the very bottom of these shell-heaps stone axes were found which, though rudely formed, were fashioned by grinding; and although the pottery found with these rude implements differed in pattern from that occuring in the higher levels of the shell-heaps, in other respects it showed nearly the same stage of advancement in the ceramic art.

It is somewhat surprising that there should be no evidence of forest growth on the shore of Bocabec River at the site of the village when first it was occupied by these men of the Stone Age, for a mere film of vegetable matter is all that separates the oldest kitchen-midden from the clay below, while the mould above the shell-heaps is from three inches to one foot in depth. These people, however, may have been driven back by the encroachment of the sea upon land in the rear of their former huts, which they had already cleared of trees and vegetable mould.

ETHNIC RELATIONS OF THE PEOPLE.

Finally, as regards the origin of the people who made these kitchen-middens at Bocabec a few words may be said.

The habits, manners and customs of the people who were known as the aboriginal inhabitants of this country when Champlain discovered the Bay of Fundy have greatly changed through the corrupting influence of contact with the new comers. Enough of their old habits and mode of living remain, when considered in the light of the accounts that have come down to us from the early explorers, to establish the similarity of their habits and mode of living to that of the men of the Stone Age who lived at Bocabec. Furthermore, the indication of a conical form to the huts, which I think is sufficiently shown by the over-lapping of the kitchen-midden upon the sleeping bench, and by the great width of the base of the doorway of the hut, point strongly to a resemblance between these huts and the well-known wigwam of the Indians.

The choosing of a small beach for the village site, the fact that they appear to have had canoes or boats of some sort to transport the vast quantities of clams which formed an important article of their diet, and which could not have been dug with ease or found in sufficient quantities in front of their village (for, as I have said, the principal clam-flats are at some distance from the village), the capture of fish which would not take the hook, but must have been taken by spear, harpoon, weir or net; the dependence of the people on hunting for the more acceptable variety in their food; the character of the rude pottery; the use of coarse woven fabrics, and a variety of other features of their culture and mode of life, are such as we know to have been common to them and the Indian tribes of Acadia.

We are, however, far from having absolute proof that these stone-age people were of the same race as the present (so called) aborigenes of the country. One needs only to read Sir Wm. Dawson's "Fossil Man" to see how many points of analogy there are between customs, tools and weapons, the remains of art, the methods of the chase, and the mode of life of the men of the stone-age in Europe and of the Indian tribes of North America. The various features of the culture and arts of the men of Bocabec are thus not necessarily those of an Indian tribe, but rather that of a people who had reached a stage of advancement similar to that in which the "Indian" nations were found when the Western World was revealed to the gaze of Europeans.

REFERENCE TO WOOD-CUT.

EXPLANATION OF VILLAGE SITE.

A—Rocky ridge on west side of village.
B—Ruins of "Phil's" House.
C—Area of plowed land,—level—covered by a layer of clam shells about 3-10 inches thick; here the hut bottoms are obliterated.
D—Swale—uneven surface, covered with weeds and bushes, and having scattered shell heaps.
E—Part of the village undisturbed by the plow. Kitchen-middens deep and hut bottoms distinct.
F—Low part of the swale, with irregular hillocks and shell heaps, now liable to be swept by the surf in heavy gales.
G—Gravelly sea-beach in front of the village.

The hut bottoms which have letters or numbers are those where the excavations referred to in this article were made.

EXPLANATION OF HUT BOTTOM "A."

H—Kitchen-middens before and behind the hut bottom.
I—Stones at the outer margin of the hut bottom.
J—Layer of beach gravel, used to raise the sleeping bench, outlining the form of the hut bottom.
K—Fire-place, with charcoal bones, sherds, etc.
L—Layer of surface mould.
M—Layer of pottery clay outside of hut.
N—Bed of clay (Leda Clay) underlying the hut bottoms.

ARTICLE III.

REPORT OF THE BOTANICAL SECTION.

THE Committee on Botany has to report excellent results from those engaged in the investigation of plants in the Province for the past year. Not only has the range of rare and local plants been extended, but in addition sixty species and varieties, not hitherto known to exist in the Province, have been added to its flora.

The value of the Herbarium has been largely increased by a gift from Mr. G. F. Matthew, who has presented to the Society his entire collection of plants, consisting of over two thousand species, chiefly European. These, with the excellent collection of New Brunswick plants already at our disposal, will make the society's herbarium a valuable one to the student of botany. The publication of a systematic catalogue of Canadian plants has been commenced by Prof. Macoun, of which Part I.—Polypetalae, has appeared. This will prove especially useful to the Canadian botanist, referring him to forms that are unsettled, and which require special attention. Of the 243 genera of the Polypetalae, described in Macoun's List, 128, or a little more than half, occur in New Brunswick; and of the 907 species, 263, or nearly a third are found in this Province. It is desirable that the list be revised in 1884. The additions to our flora since the publications of Fowler's List in 1878 (about 150 species of Phanerogams), and the mass of information accumulating since on the distribution of rare and local species, render a new catalogue almost indispensible. The botanists at work in the Province would gratefully extend to Prof. Fowler all the assistance in their power towards publishing a revised and more complete catalogue of New Brunswick plants.

Scarcely a beginning has been made here, as yet, in the study of many important groups of plants—such as the Fungi and their allies. Our botanists are earnestly recommended to turn their attention to this part of our flora, which has been so long overlooked.

As may be seen by the subjoined list of plants, but few districts, comparatively, have been explored during the past season—small portions of Queens, Victoria, and Carleton, sections of St. John and Charlotte Counties, and portions of Albert and Westmorland. The discovery of so many species new to the Province will, no doubt stimulate our botanists to turn their attention in the future to districts hitherto unexplored. Among the plants found this year are two which occupy comparatively limited areas in North America. These are *Montia fontana*, and *Potamogeton obtusifolius*, the latter of which is very rare. The former is rare in North and South America. Torrey and Gray's stations for it are Oregon, Sitka, and Labrador; Macoun's stations are Greenland, Alaska, Vancouver Island, Newfoundland, Gaspe, and Halifax.

Of Ornithopus Scorpioides, the weed found in a garden at St. Stephen, it may be said that this is probably its first appearance in America. *Mimutus moschatus* has been marked in the subjoined list as introduced, although by some botanists it is described as indigenous to North America.

The following plants, hitherto considered rare, are known to occur more frequently than previous lists would indicate: Caulophyllum thalictroides, Michx; Brasenia peltata, Pursh; Nuphar advena, Ait.; N. pumilum, Smith, (N. luteum, Sm., var pumilum, Gray,) Sanguinaria Canadensis, L.; Ranunculus Flammula, L., var. reptans, Gray; Sanicula Marilandica, L.; Spiraea tomentosa, L.; Penthorum sedoides, L.; Ludiwigia palustris, Ell.; Anemone multifida, D. C. (only along Upper St. John); Geum album, Gmelin; Lobelia Dortmanna, L.; Limnanthemum lacunosum, Griesb.; Apocynum cannabinum, L.; Solidago, bicolor, L.; S. thyrsoidea, E; Meyer; Asclepias incarnata, L.; Asarum Canadense, L; Polygonatum biflorum, Ell.; Streptopus amplexifolius, DC.; Viola canina, L,. var. sylvestris, Regel; Lonicera caerulea, L.; Arethusa bulbosa, L.; Stellaria borealis, Bigelow; S. longifolia, Muhl.; Parnassia Caroliniana, Michx.; Habenaria obtusata, Richardson; H. blephariglottis, Hook; Goodyera repens, R. Br.; Cypripedium parviflorum, Salisb.; C. pubescens, Willid.; Triglochin palustre, L.; Eriophorum alpinum, L., Rhyncospora alba, Vahl.; Oryzopis asperifolia, Michx, ; Zizania aquatica, L. ; Cystopteris bulbifera, Bernh; Woodsia Ilvensis, R. Br. ; Aspideum cristatum, Swartz; Habenaria lacera, R. Br. (common between Au Lac and Port Elgin) ; H. viridis, R. Br., var. bracteata, Reich, Petitcodiac and Havelock—Brittain; Cuscuta Gronovii, Willd., Nashwaaksis and St. Stephen, not rare about St. John, also at Lake Utopia. Papaver dubium, L., and Calendula officinalis have been produced from seeds self sown in gardens at St. Stephen for many years—Vroom; Calamintha clinopodium, Benth., Nitella flexilis, Agardh, are probably not rare.

G. U. HAY,
J. VROOM,
R. CHALMERS,
Committee on Botany.

ST. JOHN, January, 1884.

ADDITIONAL LIST OF PLANTS—1883.

30a. GLAUCIUM LUTEUM, Scop. Horn-Poppy Ballast, St. John, Sep., G. U. Hay.

34a. NASTURTIUM OFFICINALE, R. Br. True Water-Cress. Hillsborough, Aug., J. Brittain.

42. SISYMBRIUM OFFICINALE, Scop. Spreading rapidly at St. Stephen, J. Vroom.

67. SAPONARIA OFFICINALIS, L. Along shore Long Reach, Saint John River, Sep., Hay.

77a. Stellaria crassifolia, Ehrh. Thick-leaved Chick-weed. Shediac, July, Brittain.

79. S. humifusa, Rottboell. Shediac, July, Brittain.

82. Sagina procumbens, L. The apetalous form (S. apetala, L.) occurs at St Stephen, Vroom.

87b. Claytonia Virginica, L. Spring Beauty. (A specimen in McGill College herbarium is from Bathurst—Macoun's catalogue.)

88b. Montia fontana, L. Blinks, or Water Chick-weed. Shediac, July, Brittain. (Not described in Gray's Manual)

127. Astragalus alpinus, L. Petitcodiac, July, Brittain.

130a. ORNITHOPUS SCORPIOIDES, L. Scorpion Bird's-Foot. "A native of Southern Europe; a curious plant, and worth encouraging."—Prof. Lawson. Occurring in a garden at St. Stephen the past two seasons, Vroom.

166a. Rosa blanda, Ait. Early Wild Rose. Petitcodiac, July, Brittain.

191a. Proserpinaca palustris, L. Mermaid-weed. St. Patrick, Charlotte Co. In fruit Oct. 5th, Vroom.

209a. BUPLEURUM ROTUNDIFOLIUM, L. Thorough-wax. Ballast, at St. John, Sep., Hay.

213. Osmorrhiza longistylis, DC. Pollet River, near Petitcodiac, June, Brittain.

231a. Viburnum Lentago, L. Sweet Viburnum. Sheep-berry. Chiputneticook Falls, Charlotte Co. In fruit Aug., 1882, Vroom.

232a. V. dentatum, L. Arrow-wood. Chiputneticook Falls. In fruit Aug., 1882, Vroom.

239a. Cephalanthus occidentalis, L. Button-bush. St. James, Charlotte Co., Aug., Vroom.

241a Valeriana sylvatica, Richardson. Valerian. Richmond, Carleton Co., July, Vroom.

248a. Aster undulatus, L. Wavy Aster. Petitcodiac, Aug., 1882, Brittain.

249a. A. sagittifolius, Willd. Arrow-leaved Aster. Petitcodiac, Aug., 1882, Brittain.

270a. Solidago arguta, Ait. Pungent Golden-rod. Smithtown, K. C., Aug., 1882, Brittain; near St. John, Sep., '82, Hay; St. Stephen, '82; Woodstock, '83, Vroom.

277a. Xanthium strumarium, L. Common Cocklebur. Cape Bald, July, Brittain.

265b. Heliopsis laevis, Pers, var. scabra, Gray. Ox-eye. Sugar Island, St John River, 1880, Moser.

283a. ANTHEMIS TINCTORIA, L. Yellow Chamomile, Ballast, St. John, Sep., Hay.

293. Gnaphalium decurrens, Ives. Petitcodiac and Hillsborough, Aug., Brittain.

296. G sylvaticum, L. Hopewell, Albert Co., Aug., Brittain.

312. LAPPA OFICINALIS, Allioni. Var. MAJOR and var. TOMENTOSA occur much too abundantly at Richmond, Carleton Co., Vroom.

312a. LAMPSANA COMMUNIS, L. Nipple-wort. Ballast, St. John, Aug., Hay.

327a. Lobelia spicata, Lamb. Lobelia. Moncton, July, Brittain.

348a. Pyrola chlorantha, Swartz. A specimen of this plant, presented to the herbarium. by I. Allen Jack, Esq., is dated Fredericton, 1844. Petitcodiac, 1881, Brittain; Richmond, Vroom.

349a. Pyrola minor, L. Smaller Wintergreen. Hopewell, Aug., Brittain.

366. Utricularia clandestina, L. Little Rocher, Albert Co., Aug., Brittain.

368b. VERBASCUM BLATTARIA, L. Moth Mullein. Richmond, Sep., Rev. F. W. Vroom.

372a. MIMULUS MOSCHATUS, Dougl. Musk Plant. Growing in swampy land near Alma, Albert Co., Aug., Brittain.

379a. VERONICA ARVENSIS, L., Corn Speedwell. St. Andrews, 1878, Vroom; Chamcook Mt., Aug., Hay; Portage. K. C. and Hillsborough, Aug., Brittain.

382. Euphrasia officinalis, L., var. Tartarica, Benth. Cape Bald and Little Rocher, Aug., Brittain.

387a. MENTHA VIRIDIS, L. Spearmint. Baltimore, Albert Co., Aug., Brittain.

392a. SATUREIA HORTENSIS, L. Summer Savory. Found growing on railway embankment near Hillsborough, Aug., Brittain,

430a. Chenopodium hybridum, L. Maple-leaved Goose-foot Petitcodiac, Aug., Brittain.

432. Atriplex patula, L., var. littoralis, Gray, near St. John, Aug., Hay.

441. Polygonum arifoliu m, L. Halberd-leaved Tear Thumb. Hopewell, Aug , Brittain.

452. Rumex obtusifolius, L. Germain Brook, K. C., July, 1882, Brittain.

454a. Dirca palustris, L. Leatherwood. Moosewood. Wicopy. Keswick Ridge, 1881, G. H. Burnett; Hillsborough, Aug., Brittain.

456. Comandra livida, Richards. Port Elgin, A. C., July, Brittain.

466a. Urtica dioica, L. Stinging Nettle. Ballast, at Saint John, Aug., 1882, Hay.

367. U. urens, L. St. Andrews, 1879. Vroom; St. John 1882, Hay.

517b. Lemna trisulca, L. Duckweed. Duck's-meat. Petitcodiac, July, Brittain.

517c. L. minor, L. Petitcodiac, July, 1882, Brittain.

517d. L. Polyrrhiza, L Sussex, Aug., 1882, Brrttain.

526. Potamogeton Spirillus, Tuckerman, and P. gramineus, L., found at Chipman, Q. C., Wetmore.

526a. P. hybridus, Michx. St. Stephen and St. James, Aug., Vroom.

530a. P. obtusifolius, Mertens and Koch. Little Rocher, Aug., Brittain. Very rare.

531a. P. pusillus, L. Little Rocher, Aug., Brittain. Var. major, Fries. St. Stephen, Aug., Vroom.

549b. Spiranthes latifolia, Torr. Ladies' Tresses. Titusville, Aug., 1881, Brittain; Andover, July, Wetmore,

556a. Microstylis monophyllos, Lindl. Addler's-mouth. Little Rocher, Aug., Brittain.

579. Smilacina stellata, Desf. Petitcodiac, 1881, Brittain; Chipman, Q. C., Wetmore.

585a. Luzula parviflora, Desv., var. melanocarpa, Gray. Wood-rush. Upper Gaspereau, Chipman, Q. C., July, Wetmore.

595a. Juncus pelocarpus, E. Meyer. Quaco, Aug., 1882, Brittain.

595b. J. articulatus, L. Hampton, 1882, Baie Verte, 1882, Brittain.

599a. Cyperus diandrus, Torr. Fredericton, Wm. Massey.

600. C. phymatodes, Muhl. Fredericton, 1880, Vroom.

616. Eriophorum russeolum, Fries. Cape Bald, Hillsborough, and Cape Enrage, July, Brittain. Abundant at Chipman, Q. C., Wetmore.

624a. Carex bromoides, Schk. Pollet River and Portage, June, Brittain.

627a. Carex rosea, Schk. Petitcodiac, and Portage, K. C., July, Brittain.

635. C. adusta, Boot. Petitcodiac, 1882, Brittain.

637. C. straminea, Schk. var. festucacea, Gray. Digdeguash River, Aug., Hay.

653. C. gracillima, Schw. Andover, 1882, Hay.

654. C. laxiflora, Lam., var. hirsuta, Dewey. Norton, K. C., July, Hay.

654a. C. pedunculata, Muhl. Nashwaaksis, York Co., 1881, J. Moser; Petitcodiac and Havelock, Brittain.

655. C. umbellata, Schk. Rather common at Petitcodiac, Brittain.

656. C. Novae-Angliae, Schw. Rather common at Petitcodiac, Brittain.

658. C. Pennsylvanica. Lam., and C. varia, Muhl., Chipman, Q C., Wetmore.

661. C. Arctata, Boot. Various places in Westmorland, Aug., Brittain.

664. C. flexilis, Rudge. Common at Petitcodiac, Brittain.

674a. C. folliculata, L. St. Martins, 1882, Brittain.

679a. C. vesicaria, near St. John, 1881, Hay.

682a. C. longirostris, Torr. Andover, July, 1882, Wetmore.

695a. Calamagrostis arenaria, Roth (Ammophila arundinacea of Vasey's Catalogue,) Courtenay Bay, St. John, Hay.

704a. Glyceria pallida, Trin. Petitcodiac, Brittain.

713a. Poa debilis, Torr. Petitcodiac, 1882, Brittain.

718a. **LOLIUM PERENNE**, L. St. John, Aug., Hay.

718b. L. **TEMULENTUM**, L. St John, Aug., Hay.

732a. Milium effusum, L. Richmond, July, Vroom.

726a. Setaria verticillata, Beauv. On ballast, St. John, Aug., Hay.

773a. Ophioglossum vulgatum. L. Adder's Tongue, Hopewell and Enrage, July, Brittain.

780b. Isoetes echinospora, Durieu, var. Braunii, Engelm. Charlotte County, Aug., Vroom.

ARTICLE IV.

MAMMALS OF NEW BRUNSWICK.

BY MONTAGUE CHAMBERLAIN.

INTRODUCTION.

So far as has been ascertained, there have been but two catalogues of the Mammals of this Province previously published; one of these appeared in a work by Abraham Gesner, Esq., issued in 1847, entitled "New Brunswick; with notes for Emigrants, comprehending the early History, etc.;" the other is placed among the appendices to "Field and Forest Rambles," a work on New Brunswick, by Dr. Leith-Adams, published in 1873. Neither of these catalogues being correct—when judged by the result of more recent investigations—a new one has been called for, and it is to meet this demand that the present paper is now published.

All of the species mentioned have been identified by the writer, excepting a few otherwise noted in the text; but in deciding upon the relative abundance he has had to depend, to a large degree, upon the opinions of others, and while the best available information has been obtained, it is very probable a difference of opinion may exist regarding the correctness of some of the determinations. A criticism of the catalogue is invited from observers throughout the Province, with a view of having whatever errors it may contain rectified in a future edition.

Want of space prevents him mentioning the names of all the gentlemen who kindly gave the writer the benefit of their observations, and to whom he desires to express his thanks; but he is under especial obligation to Mr. James Vroom, St. Stephen, and to Mr. John Stewart, Woodstock, for valuable notes.

The classification and nomenclature is that of Jordan's "Manual of the Vertebrates," excepting a slight difference in the Bats, copied from Dobson's "Catalogue of the Chiroptera."

CATALOGUE.

1. PANTHER. *(Felis concolor.)* Dr. Gesner records this species as "rare" (in 1847). No recent instances of its occurrences are known.

2. CANADA LYNX. "LOUP-CERVIER." "LOOCERVEE." *(Lynx canadensis.)* Common.

3. BAY LYNX. "WILD CAT." *(Lynx rufus.)* Common.

4. WOLF. *(Canis lupus.)* Was common from 1840 until about 1860; since then it has entirely disappeared. Dr Gesner states that Wolves were first seen in New Brunswick in 1818.

5. RED FOX. "SILVER FOX." "BLACK FOX." "PATCH FOX." "CROSS FOX." *(Vulpes vulgaris.)* Abundant.

6. SABLE. PINE MARTEN. *(Mustela americana.)* Common.

7. FISHER. BLACK CAT. *(Mustela pennantii.)* Rare.

8. LEAST WEASEL. *(Putorius vulgaris.)* Common.

9. COMMON WEASEL. ERMINE. *(Putorius ermineus.)* Common.

10. MINK. *(Putorius vison.)* Common.

11. WOLVERINE. *(Gulo luscus.)* Some thirty years ago it was occasionally met with; but no recent instance of its occurrence is known.

12. SKUNK. *(Mephitis mephitica.)* Abundant.

13. OTTER. *(Lutra canadensis.)* Rather common in favorable localities.

14. BROWN, BLACK or CINNAMON BEAR. *(Ursus americanus.)* Common.

15. RACOON. *(Procyon lotor.)* Common along the Bay of Fundy coast; but very rare in the interior.

16. MOOSE. *(Alce americanus.)* Not uncommon.

17. CARIBOU. *(Rangifer caribou.)* Common.

18. VIRGINIA DEER. *(Cariacus virginianus.)* Uncommon, though increasing. This Deer was formerly restricted to the valley of the Magaguadavic; but has lately spread into other portions of Charlotte and York Counties, and a few have been taken in Carleton and Victoria. There is no record of any having been ob-

served east of the St. John River. Dr. Gesner states that this species was first seen in New Brunswick in 1818, the same year in which the Wolf appeared, and that by 1847 it had become plentiful.

19. LITTLE BROWN BAT. (*Vespertilio subulatus.*) Common.

20. RED BAT. (*Atalapha noveboracensis.*) Rare.

21. HOARY BAT. (*Atalapha cinerea.*) Uncommon.

22. COMMON MOLE. (*Scalops aquaticus.*) Abundant.

23. HAIRY-TAILED MOLE. (*Scapanus breweri.*) Very rare. I have seen but one specimen, which was taken in Charlotte County.

24. STAR-NOSED MOLE. (*Condylura cristata.*) Common.

25. COMMON SHREW. (*Sorex platyrhinus.*) Common.

26. WESTERN SHREW. (*Sorex cooperi.*) Rare.

27. MOLE SHREW. (*Blarina brevicauda.*) Common.

28. FLYING SQUIRREL. (*Sciuropterus volucello.* Common.

29. GREY SQUIRREL. (*Sciurus carolinensis.*) A few have been observed in Charlotte and Carleton Counties, near the western border.

30. RED SQUIRREL. (*Sciurus hudsonius.*) Very abundant.

31. GROUND SQUIRREL. "CHIPMUNK." (*Tamias striatus.*) Common.

32. WOODCHUCK. GROUND HOG. (*Arctomys monax.*) Common.

33. BEAVER. (*Castor fiber.*) Not so numerous as formerly, and now principally restricted to the wilderness portions of the Province, though Mr. Stewart writes to me: "I find the Beaver are coming back to the streams in Carleton and York Counties that have been abandoned by the lumbermen."

34. JUMPING MOUSE. "WOOD MOUSE." (*Zapus hudsonius.*) Uncommon.

35. BROWN, OR NORWAY RAT. (*Mus decumanus.*) Abundant in the towns near the seaboard, and gradually spreading inland along the rivers. On the St. John River, it has been traced as far inland as Grand Falls.

36 BLACK RAT. (*Mus rattus.*) Mr. G. A. Boardman reports finding a few examples near St. Stephen.

37. **House Mouse.** (*Mus musculus.*) Abundant near the seaboard.

38. **Deer Mouse. White-footed, Mouse.** (*Hesperomys leucopus.*) Common in the interior.

39. **Long-eared Mouse.** (*Evotomys rutilus.*) Common.

40. **Meadow Mouse** (*Arvicola reparius*) Abundant.

41. **Muskrat. Musquash** (*Fiber zibethicus.*) Adundant

42. **Porcupine** (*Erethizon dorsatus.*) Common.

43. **Rabbit. Northern Hare.** (*Lepus americanus.*) Very abundant.

MARINE MAMMALS.

Harbor Seal. Common.

Harp Seal. Occasional, in winter.

Hooded Seal. A few have been observed along the Gulf of St. Lawrence coast.

Porpoise. Common.

Whales have been occasionally reported in the Bay of Fundy and off the "North Shore;" but the species are, for the most part, conjectural.

SUMMARY OF MEETINGS.

FEBRUARY 6TH.

THE President, Dr. Botsford, read his annual address, taking for his subject, "The Human Thumb," showing how much through its instrumentality the scope of human knowledge had been extended. Without its aid in manipulating the objects used in the manufacture of implements, and instruments for observation, human knowledge could not have been so extensive and varied as now, and the sciences could hardly have had an existence.

MARCH 6TH.

Mr. J. C. Allison, C. E., read a paper on "Topographical Surveying and Contour," explaining the method by which Contour maps were made, and the practical application of surveying to the laying out and improvement of land.

APRIL 3rd.

On this evening there was a discussion on the subject, "How was America first peopled?" Mr. J. A. Estey introduced the subject, referred to the characteristics of the American civilization, and the possible origin of its aboriginal population. Several members took part in the discussion, and much information was elicited as to the races which had probably contributed to the original population of America.

MAY 1ST.

Mr. M. Chamberlain read a paper on "The work before an Ornithologist in New Brunswick," in which he drew attention to the need of studying the life-history, habits and migrations of birds found in this Province. He also described the "Provinces" in North America through which the birds were distributed, in one of which New Brunswick was included.

JUNE 5TH.

Mr. W. S. Carter read an instructive essay on "Heat," describing its relations to electricity, chemical affinity, friction, vital force, &c. Its application in the construction of philosophical instruments and especially in the utilization of steam, was spoken of.

JUNE 19TH.

Mr. G. F. Matthew read a paper on the "May-flower of the Loyalists," shewing that the Hawthorne, the Spring Beauty, and the Trailing Arbutus had been successively the May-flower of the Loyalists and their descendants. The Hawthorne (*Crataegus oxycantha,*) when they arrived in America; the Spring Beauty (*Claytonia Caroliniana*), to some of the Connecticut Loyalists and; the Trailing Arbutus (*Epigaea repens*), after their arrival in this country. This latter is the plant which is called "May-flower" by their descendants here.

At the same meeting, a paper by Mr. J. E. Wetmore was read, describing the plants found growing on the terraces of the Saint John River, in Carleton County.

JULY 3RD.

A meeting was held this evening to receive reports of members who had attended the field meeting. At Sutton, where the meeting was held, the rock in the ledges along the shore of the Saint John River was found to be a micaceous gneiss, cut by dykes of diorite. Interesting observations were made on the birds of the vicinity. The plants were of a northern or subarctic grouping, mingled with the ordinary vegetation of the country. Colombine (*Aquilegia vulgaris*) was found as a "garden 'scape."

SEPTEMBER 4TH.

Mr. W. F. Best delivered an address on "Crystallization," which was illustrated by lantern views, shewing the process of the crystallization of salts from saline solutions.

SEPTEMBER 18TH.

Prof. L. W. Bailey, Ph. D., delivered a very entertaining and instructive lecture on "The American Pre-Historic Man." He referred to the discovery by himself at Indian Point, Grand Lake, of various stone weapons and ornaments, as well as of fragments of pottery, the place having been the site of an Indian encampment. He closed with a brief summary of opinions as to the origin of the Mound builders of the Mississippi Valley, &c.,

The lecture was illustrated by views of objects found in that region, and of local antiquities.

OCTOBER 9TH.

Prof. J. H. Panton, of Winnipeg Manitoba, delivered an address on "Gleanings from the Geology of the North-West," in which he described the great prairie "steppes" of the North-West Territory of Canada. The geology of this region had an intimate relation to its physical geography. The Professor gave very entertaining descriptions of various points of interest along the Canada Pacific Railway, which he had visited, and whose geological treasures he had collected.

NOVEMBER 6TH.

Mr. G. F. Matthew gave an account of an Osirid which had recently been found in the museum of the Mechanics Institute. The inscription on this little figure had been transmitted to Prof. T. O. Paine, of Elmwood, Mass., a well-known oriental scholar, who gave the following as the meaning of the hieroglyphic text:

"Glorified Osiris Paneh the blessed said: Behold this image is that of [me] a chief reader and chief burier of the dead. It will do for all people what is to be done in the divine underworld When the meadows grow green; when the banks are inundated; when the boat is paddled along the sandy shores from east to west, * * *.'"

Prof. Paine adds, in explanation, that the meaning is: When the friends left behind on old Nile are enjoying life, he wishes to be spoken to, and to have part in their pleasures, as when he was with them. This Osiris being in the divine image, it was omnipotent against evil in the future world. An Osiris, or, as here named, a *Shebwee*—image of Osiris, and at the same time of (Pa-aa-neh) was an *ariash* and an *ariut* priest—one who was a "chief reader," and "chief burier." He led the funeral procession and read the service. The hieroglyphics all belong to the high Pharaonic epoch. But one of the signs is new, or not published by Brugsch or Rouge.

DECEMBER 4TH.

Mr. Alfred Morrisey described the habits and characteristics of the Woodpeckers, in connection with a paper on the "Pileated

Woodpecker" (*Hylotomus pileatus*). These birds are ruthless enemies to insects, and therefore worthy of protection on account of their benefits to the lumberman and horticulturist.

Mr. J. H. Banks read a paper on the habits of the Horned Owl (*Bubo virginianus*) in confinement. Mr. Banks' paper was published in an American magazine.

JANUARY 4TH.

This evening was devoted to papers on botanical subjects. Mr. John Brittain, of Petitcodiac, read a paper on the grasses of New Brunswick, noting the occurrence of rare forms, and speaking of the advantage of introducing orchard grass and other varieties more generally into the mixtures which were sown for meadow and pasture lands.

Mr. J. Vroom, of St. Stephen, referred chiefly to the wild species growing in this Province which were available for cultivation, either for ornamental shrubs or for the flower garden, or on account of their fruit or fibrous stems.

Mr. G. U. Hay, read a paper on "Bacteria," which is among the occasional papers in this number of the BULLETIN.

N. B.—Dr. Botsford's paper on "Conversion of Light into Heat," read at the conversazione, 25th January, and Mr. G. F. Matthew's paper on "Discoveries at a Village of the Stone Age at Bocabec," read 5th February, will also be found in this number of the BULLETIN.

OFFICERS FOR 1884.

His Honor the Lieutenant Governor, Patron; LeB. Botsford; M.D., President; M. Chamberlain, W. F. Coleman, M. D., Vice-Presidents; James A. Estey, Treasurer; Geo. U. Hay, Corresponding Secretary; W. J. Wilson, Recording Secretary; S. W. Kain, Librarian; G. F. Matthew, F. W. Daniel, W. F. Best, Curators; R. P. Starr, W. S. Harding, M. D., and Edwin Fisher, Members of Council.

BULLETIN

OF THE

NATURAL HISTORY SOCIETY

OF

NEW BRUNSWICK.

No. IV.

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ANNUAL ADDRESS OF THE PRESIDENT,

LeB. Botsford, M. D.

ETHICS OF LAW.

[*Read* 20*th February*, 1885.]

A FEW WORDS to define what is meant by law, before entering upon my subject. The term law is understood to mean or infer a force which causes similar results under similar conditions. In calling it a law we, however, merely state a fact, we do not reach nor explain the source of the fact. This principle is manifested or acknowledged in the realm of matter, in organic life, in intellectual and moral phenomena.

Thus in matter we accept the fact that liquids ever tend to take a level position. Numerous observations establish the fact, and we regard it as one law of their condition. In calling it a law, however, we do not explain the source of that fact. Looking into it further, we find that owing to gravity, or, in other words, the attraction of a large mass of matter, the earth for instance, every molecule of a liquid is virtually acted upon equally and is forced to take its place until each molecule of the upper layer occupies the same distance from the attracting body. This is, however, a mere statement of a fact. So also it is with the law of gravity. Gravity is a term only, it signifies the result of observations upon matter. We are led by many observations to recognize the sense of weight, and this eventually drives us to the conclusion that the idea of weight arises from an unseen force which draws matter towards matter. Further observations lead us to conclude that attraction is in relative proportion to the masses and their distance. To call this gravity or attraction does not explain the why nor the wherefore;

it merely expresses a fact. The law, or rather laws, of optics are first learnt by a series of experiments or observations. And when the law is recognized, it is after all a term applied to similar results under similar conditions. The ultimate force or forces are beyond the ability of man to define or to comprehend. But whilst we are unable to know what the effective force may be, we yet are able to conclude that if any conditions are wanting, or other conditions are added, the sequence of events will be changed, or the working of that particular sequence will be interrupted.

IN THE ORGANIC WORLD

a similar grouping of facts occurs. In the growth of plants, and the conditions under which they are found, certain sequences are traced and become recognized as laws of growth or development. Also in the animal economy we are led to generalize—the varying families, the conditions of their existence, their modified organs of life, the circumstances which may be favorable or injurious in their action. We call these results of our investigations laws of being. They state facts as to sequence, but do not give the reason why they should be results. So also with the laws in the intellectual world. The law of association, in which one thought or sensation recalls another which was cotemporary with it. To call it a law does not explain why such should be. The frequent repetition which strengthens the power to recall is one of the laws of mental action, but to apply to it the term law merely expresses the fact—does not explain the cause. In the moral we are forced to admit certain results as the consequence of moral feelings in action. We speak of a law of love; we know that an emotion in one person excites a similar emotion in another. We may apply the term law to it, but that does not solve the difficulty.

I have spoken of the Ethics of Law. By this I mean the manner in which results occur; the obligation which exists in the sequence of events; the obedience to a command. The term ethics is generally used to denote a moral relationship in conduct as in man to man. I claim its use in the other departments to the relations of matter and the organic laws as truly as it may be applied to the intellectual and must be to the moral faculties.

To know the ethics—that is, the manner, obligation and obedience—of the laws of matter, is to recognize the principles or forces which ever tend to produce similar results. By applying this to matter, or seeking them in a uniformity of action, we enter upon the realm of natural philosophy in its various phases. To investigate the changes which this earth has undergone and the order in which they have occurred will constitute the work of a geologist. To scan the heavens and trace the connection of sun, moon, planets and stars will be the office of the astronomer. To analyse and combine the different elements contained in matter is the province of the chemist. In doing this the truth is demonstrated that physical laws ever tend towards the same results and are permanent as regards the action of matter on matter. Thus the most solid foundation is laid for the superstructure which is built by natural philosophers.

The ethics of the organic laws lead to or urge the true method to ascertain the forms and growth of *plants*, their properties, the conditions under which they thrive. The elements contained in the soil, those which enter into their composition—the heat, the cold and the moisture which conduce to their benefit. In this field of observation the botanist becomes the man of science, and the farmer will profit according to his knowledge. I know of no class of persons who should benefit by knowledge in this and general subjects more than those who till the soil. In the study of the functions of the organs in the animal economy, and their interrelationship, the physiologist arrives at his knowledge, whilst the observation of what interferes with their healthy play or adds to their freedom of action falls more especially to the lot of the physician and the hygienist.

WHEN WE ASCEND

to the realm of intellect the forms become more subtle, and the ethics or right action of the laws of the mind require a more profound analysis. The science of teaching is still in its infancy. The methods of individuals are prevalent; no general law to form the rules best adapted to train the intellectual powers, no concensus upon the proportion which memory should occupy—no decided agreement even upon the use of the classics as a study. In fact, confusion rather than order prevails. In our province method has been recognized and one step has been taken by requiring the teachers of our schools to learn in a head *training school* how to impart knowledge and what to impart. In the government of the nations the politicians rule more by expediency than by any fixed laws. The experience of the past is but little used to guide the present—a common-sense view of justice and right has through many centuries built up a system of common law, and it is doubtful if statute law enacted by the wisest legislators has added much to its wealth. The laws of trade form a battle ground for party to fight against party, rather than an exhibition of concentrated wisdom. And though in our courts the law of evidence is tolerably understood, there is a vast field of indistinct knowledge that some day may come under the codifying ethics of the intellectual laws.

In the region of morals there are laws, as in all else. We cannot conceive that any department of philosophy can exist without them. And to this one especially is the term ethics truly applicable. Whilst by the exercise of our natural powers we can come to right conclusions in natural philosophy — in the organic world and in the working of the intellect, however abstruse and difficult the last may be, yet in the moral field our ability is very limited, and it is doubtful if the moral laws ever could be decided by the unaided intellect of man. I do not say that with advancing knowledge we may not rise to a rational perception of these rules, and feel their necessity and see their beauty in clear outlines. But when nation differs from nation in circumstances and characteristics, nay, when individual differs from individual, there is but little possibility of a oneness of conclusion in the moral rules which should govern our actions. If these rules are to be universal they must come from authority outside and above humanity.

THE MORAL PART OF MAN

connects him with something above him. It enables him to respond to demands from a higher source. It constitutes the border land where the seen and unseen blend; where the *spiritual* illumines the darkness, and renders certain and universal what otherwise would be uncertain and limited. It has been well for man that co-eval with the race a moral revelation has been promulgated, that it came from a higher source, that it opened out, as we rose in our power to receive it, until it culminated in a living example, THE DIVINE LOGOS.

The moral differs from the other departments of knowledge. In them the faculties of man are left to grapple with the world, and its phenomena; in the other we have the necessary proffered help.

The highest attainment in philosophy will be when all the departments of knowledge are studied in their due proportion by minds endowed with the greatest powers.

One man, indeed, may be an enthusiast in natural history, yet be ignorant of geology. Another may be deeply versed in botany, yet be a mere tyro in other directions. One may be profound in mathematics and mental phenomena, yet with no knowledge of the earth upon which he stands. Another may have plumbed the depths of all the sciences, yet given no time to drink in the realities connected with the moral world. There are some with large mental powers, like Newton, who, to vast acquisitions of knowledge of things in the heavens above and in the earth beneath, have added a childlike attitude to the teaching from above and attained to that wisdom which clothes humanity with its highest dignity.

⁂

PRELIMINARY LIST OF THE PLANTS OF NEW BRUNSWICK.

COMPILED BY REV. JAMES FOWLER, M.A.

With assistance of Members of N. B. Natural History Society.

HISTORICAL NOTE.

THE writer has been unable to obtain any published information on the Flora of New Brunswick of earlier date than 1862. The name of the Province occurs a few times in the works of Pursh, Hooker, Gray and others, but only in connexion with the distribution of some particular species of plant. During the above-mentioned year there appeared "A Description of the Forest and Ornamental Trees of New Brunswick, by D. R. Munro, St. John, N. B." As the author proves himself innocent to the last degree of all knowledge of Botany, his descriptions are simply amusing exhibitions of the power of imagination.[1] On February 12th, 1864, Prof. L. W. Bailey read an interesting paper entitled "Notes on the Geology and Botany of New Brunswick" before the Natural History Society, which was subsequently published in the *Canadian Naturalist* for April of the same year. The author describes the character of the country from the mouth of the Tobique to its source, and thence down the Nepisiquit to Bathurst, giving partial lists of the plants met with on the route. The reading of this paper gave an impulse to the Botanic talent of the Society, and at the following April meeting (April 8, 1864) Mr. Robert Matthew read a "List of the Plants of New Brunswick," but, unfortunately, it was never published. (See Bulletin Nat. Hist. Soc., I, p. 18.)

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[1] He describes three species of Oak, two of Elm, three of Beech, and three of Ash as being abundant. His Bilberry (Vaccinium) grows into a tree thirty feet and upwards, and Dogwood (Cornus Florida) is abundant, attaining a height of thirty feet. He finds two species of Moose Wood — the Round-leaf and the Notch-leaf Moose Wood.

The next notice appeared in 1869, when Mr. G. F. Matthew published a valuable and thoughtful paper "On the Occurrence of Arctic and Western Plants in Continental Acadia." The paper was read before the Society, April 13, 1869, and published in the June number of *Canadian Naturalist.*

In 1876, Dr. L. W. Bailey and Edward Jack, Esq., prepared and published a "Descriptive Catalogue of the Woods and Minerals of New Brunswick," for use at the Centennial Exhibition at Philadelphia. It embodies a large amount of valuable information from an economic standpoint, and gives the most reliable account of the uses of our forest trees that has yet been presented to the public.

No further references to the subject occur till January, 1879, when the Provincial Agricultural Report for the previous year appeared with a "List of New Brunswick Plants" by the present writer. The List was subsequently published in the *Educational Circular.* It gives the names of 1,074 species, 743 of which are Phanerogams and the remainder Cryptogams. All of these the writer had himself collected or seen in the possession of others. The publication awakened the interest of the students of Botany, and specimens of rare or new plants were forwarded to him from different parts of the Province. His own residence in Fredericton in 1878–9 gave him an opportunity of securing some new material, and in the Report of the following year (1880) he published "Additions to the List of New Brunswick Plants," accompanied by an article on the "Advantages resulting from a Knowledge of the Flora of our Province."

In 1882 the New Brunswick Natural History Society published the first number of its Annual Bulletin, containing the Report of the Botanical Committee of the Society, and a List of the species discovered since the publication of the previous paper. The two succeeding Bulletins contain additional Lists bringing up the number of species discovered to the close of 1883. In Bulletin No. 2 appeared an interesting paper on the "Botany of the Upper St. John" by Mr. G. U. Hay, who has devoted considerable attention to an investigation of the plants of the St. John and its tributaries. Since his removal to Ontario (1880) the writer has received specimens of many new species from botanic friends, and by their kind aid has compiled the present Catalogue as a contribution to the advancement of Botanic Science in his native Province. His aim has been in the compilation to exclude every species of which he had not seen a specimen. The few instances in which he has deviated from this rule are mentioned in their appropriate places. A few genera, such as Aster and Solidago, are in a very unsatisfactory condition, and it is exceedingly desirable that Botanists make special efforts to secure large collections of perfect specimens for future study, that the true character of our species may be ascertained.

It is unnecessary to say that the present List is imperfect owing to the fact that only a limited area of the Province has yet been visited by Botanists. Every year will add new species to the number already known, but the author trusts that the assistance he has rendered to the students of our Flora will secure for him the kind indulgence of the reader.

The order and names of Families and Genera are, with very few exceptions, those of Bentham & Hooker's *Genera Plantarum.* The specific names are from Watson's Index and Gray's Synoptical Flora as far as they go. The remainder are taken from the Manual.

The writer acknowledges, with warmest gratitude, the kind assistance he has received from such students of New Brunswick's Flora as G. F. Matthew, George U. Hay, J. Brittain, R. Chalmers, J. E. Wetmore, J. Vroom, J. Moser, and others, without whose aid this work would have been impossible.

JAMES FOWLER.

QUEEN'S COLLEGE, KINGSTON, ONT.
February 4, 1885.

A PRELIMINARY CATALOGUE

OF THE

PLANTS OF NEW BRUNSWICK.

PHANEROGAMIA.

CLASS I.—EXOGENOUS PLANTS.

SUB-CLASS I.—ANGIOSPERMÆ.

DIVISION A.—POLYPETALÆ.

I. RANUNCULACEÆ.

1. CLEMATIS, L. - - VIRGIN'S BOWER CLEMATIS.

1 C. verticillaris, DC. St. Stephen, *Vroom;* abundant on Nashwaaksis, *Moser;* Herb.[1]

2 C. Virginiana, L. Common throughout the province.

2. THALICTRUM, Tourn. - - - MEADOW-RUE.

3 T. dioicum, L. Fredericton, *Fowler;* Keswick Ridge, *Dr. Bailey,* Nashwaaksis, Douglas, *Vroom,* Herb.; Grand Lake, Woodstock, Eel River, St. Francis, Tobique, *Hay;* Bailey, Can. Nat., 1864, p. 83; Flat Lands, Restigouche. *Chalmers.*

4 T. Cornuti, L. Very common along wet banks of brooks. Herb.

3. ANEMONE, L. - - ANEMONE. WIND-FLOWER.

5 A. multifida, DC. St. John River above Fredericton, Grand Falls, *Moser;* from mouth of St. Francis to Tobique, *Hay.* Bulletin II. 27.

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[1] *Herbarium of New Brunswick Natural History Society.*

6 A. cylindrica, Gray. St. Francis River, *Hay*.

7 A. Virginiana, L. Mouth of Upsalquitch, *Fowler;* Grand Falls, St. John River, *Moser;* Lower Kennebeccasis, Madawaska, St. Francis, *Hay*, Bulletin II. 25, 27; Andover and along St. John, *Wetmore.*

8 A. dichotoma, L., (A. Pennsylvanica, L.) Rather common throughout the province.

9 A. nemorosa, L. Rare in northern counties. Near mouth of N. W. Miramichi, *Fowler;* South Bay, *Mrs. Heustis;* Rothesay and Bloomfield, *Hay*, Herb.

10 A. Hepatica, L., (Hepatica triloba, Chaix.) Keswick Ridge, Herb. N. B. Univers., *Fowler;* in Herb., *Moser;* St. Stephen, *Vroom;* Petitcodiac, *William Price.*

4. RANUNCULUS, L. - BUTTERCUP. CROWFOOT.

11 R. aquatilis, L., var. trichophyllus, Gray. In sluggish brooks. Black River, Northumberland Co.; Bass River, Kent Co., *Fowler*, in Herb.; Tobique River, *Hay*.

12 R. multifidus, Pursh., (R. Purshii, Torrey). In ditches at Point de Bute and Belledune.

13 R. Flammula, L., var. reptans, Gray. Woodstock, *Fowler;* Fredericton, Herb.; common at Salmon River and Andover, *Wetmore;* along St. John River, *Hay*.

14 R. Cymbalaria, Pursh. Near brackish or salt water along the rivers Kouchibouguac, Richibucto, St. John, *Fowler;* Herb.

15 R. abortivus, L. Bass River, Kouchibouguac, *Fowler;* Lancaster, *Mrs. Heustis;* Hampton, *Hay*, Herb.

16 R. sceleratus, L. Shediac, River Charlo, *Fowler;* St. Stephen, *Vroom.*

17 R. recurvatus, Poir. Along a small shaded brook near Manse, Bass River, Fredericton, *Fowler;* Kennebeccasis and St. John, *Hay*, in Herb.; *Vroom;* Clifton and Andover, *Wetmore.*

18 R. Pennsylvanicus, L. Rather rare. Kouchibouguac, *Fowler;* Grand Lake and Keswick Ridge, *Hay*, Herb.

19 R. repens, L. We have two forms, one introduced and common about St. John, the other taller and smoother, native. The introduced form may be recognized by its hairy creeping runners and blotched leaves.

20 R. ACRIS, L. Abundant everywhere.

5. CALTHA, L. - - - - MARSH MARIGOLD.

21 C. palustris, L. Common. Bass River, Coal Branch, Kent Co., *Fowler;* Indian Falls on Nepisiquit, *Dr. Bailey*, Can. Nat. 1864, p. 92; Madawaska County, *Hay*.

6. COPTIS, Salisb. - - - - - GOLDTHREAD.

22 C. trifolia, Salisb. Common. Bass River, Miramichi, *Fowler;* Carleton, Herb. *Mrs. Heustis; Hay*, Herb.

7. AQUILEGIA, Tourn. - - - COLUMBINE.

23 A. VULGARIS, L. Escaped from gardens near St. John, *Fowler;* Milkish and Aroostook Falls, *Hay*, Herb. Bulletin II. 29.

8. ACTÆA, L. - - - - - - BANEBERRY.

24 A. spicata, L., var. rubra, Michx. Bass River, *Fowler;* Campbellton, *Hay*, Herb.

25 A. alba, Bigel. Rather rare. Fredericton, *Fowler;* Campbellton, *Hay*, in Herb.; in rich woods along St. John, *Hay.*

II. BERBERIDACEÆ.

9. BERBERIS, L. - - - - - - BARBERRY.

26 B. VULGARIS, L. Occasionally found near garden fences.

10. CAULOPHYLLUM, Michx. - PAPPOOSE-ROOT.

27 C. thalictroides, Michx. Nashwaaksis, *Moser;* rich intervales of Upper St. John, St. Francis, Eel River, Andover, *Hay*, Herb., Bulletin II. 25, 30; Aroostook Junction on rich flats, *Wetmore.*

III. NYMPHÆACEÆ.

11. BRASENIA, Schreber. - - WATER-SHIELD.

28 B. peltata, Pursh. Near residence of W. S. Butler, Esq., Grand Lake. Near railway station, Fredericton, *Fowler;* Cox's Point, Grand Lake, *Hay*, Herb.; St. Stephen, *Vroom;* Clifton Lakes and Salmon River, *Wetmore.*

12. NUPHAR, Smith. - - YELLOW POND-LILY.

29 N. advena, Ait. Abundant in King's Co., Salmon River, Q. C., St. John Co., *Hay*, Herb.; Springfield and St. Croix River, *Fowler;* Nepisiquit Lakes, *Dr. Bailey*, Can. Nat. 1864, p. 90; abundant in lakes near Campbellton, *Chalmers.*

30 N. pumilum, Smith. Woodstock, *Fowler;* abundant at Salmon River, *Wetmore;* Petitcodiac and Nauwigewauk, *Brittain;* Nepisiquit Lakes, *Dr. Bailey*, Can. Nat. 1864, p. 90; Keswick, Nepisiquit Lakes, *Hay*, Herb. Bulletin II. 31.

13. NYMPHÆA, Tourn. - - - - WATER-LILY.

31 N. odorata, Ait. Lakes in St. John Co., Grand Lake, *Fowler*, *Hay;* Gondola Point and other places in King's Co., *Hay*, Herb.; St. Croix River, *Vroom.*

IV. SARRACENIACEÆ.

14. SARRACENIA, Tourn. - SIDE-SADDLE FLOWER.

32 S. purpurea, L. Common in bogs. Point Escuminac, Fredericton, *Fowler;* St. John, *Hay*, Herb.

V. PAPAVERACEÆ.

15. PAPAVER, L. - - - - - - POPPY.

33 P. SOMNIFERUM, L. Spontaneous in gardens. Scarcely wild.

16. SANGUINARIA, Dill. - - - - BLOODROOT.

34 S. Canadensis, L. Petitcodiac, *Brittain;* Nashwaaksis, *Vroom* in Herb.; Keswick Ridge, *Moser;* Metapedia, *Chalmers;* common at Aroostook Junction, *Wetmore;* abundant on St. Francis, low lands on Tobique, along Upper St. John, Eel River, *Hay.* Bulletin II. 25, 30.

17. CHELIDONIUM, L. - - - - CELANDINE.

35 C. MAJUS, L. A garden weed in Fredericton, *Fowler;* Richmond, Carleton Co., *Vroom*, Herb.; apparently naturalized at Lower Woodstock, *Hay.*

VI. FUMARIACEÆ.

18. DICENTRA, Bork. - DUTCHMAN'S BREECHES.

36 D. Cucullaria, DC. Bass River, Salmon River, Kent County, *Fowler;* Dutch Valley, *Wetmore;* in Herb. *Mrs. Heustis;* Hampton and Norton, *Hay*, Herb.; common in rich woods at Andover, Salmon River, Waterford, *Wetmore.*

19. CORYDALIS, Vent. - - - - CORYDALIS.

37 C. glauca, Pursh. Road from Weldford Station to Salmon River, Fredericton, *Fowler;* Douglas Mountain and Milkish, *Hay*, Herb.; Highland Park, Herb. *Mrs. Heustis;* Island in Nictau Lake, *Dr. Bailey*, Can. Nat. 1864, p. 88.

20. FUMARIA, L. - - - - - - FUMITORY.

38 F. OFFICINALIS, L. In a few places, Buctouche, St. John, *Fowler;* Woodstock, *Hay*, Herb.

VII. CRUCIFERÆ.

21. NASTURTIUM, R. Brown. - WATER-CRESS.

39 N. officinale, R. Brown. Hillsborough, *Brittain;* Carleton, *Hay*, Herb.

40 N. palustre, DC. Fredericton, *Fowler;* Kennebeccasis, *Matthew;* along St. John River, Grand Falls, *Hay.*

22. BARBAREA, R. Brown. - - WINTER CRESS.

41 B. VULGARIS, R. Brown. Weed in fields, Richibucto.

23. ARABIS, L. - - - - - - ROCK CRESS.

42 A. petræa, Lam. On cliffs of Minister's Face, *Wetmore.*

43 A. hirsuta, Scop. Eel River, Restigouche County, Portland, *Fowler*, Herb.; Grand Falls, Madawaska, *Hay.*

44 A. Drummondii, Gray. Sand beach at Eel River, Restigouche County, St. John, *Fowler*, Herb.

24. CARDAMINE, L. - - - BITTER CRESS.

45 C. pratensis, L. Fls. purple. St. Patrick, Charlotte County, *Vroom*, Herb.

46 C. hirsuta, L. Common. Bass River, Fredericton, Carleton, *Fowler;* Herb. *Mrs. Heustis;* Campbellton, Herb.

25. DENTARIA, L. - TOOTHWORT. PEPPER-ROOT.

47 D. diphylla, L. Bass River, Fredericton, *Fowler;* St. John and King's Co., Quispamsis, *Hay*, Herb.; Campbellton, *Chalmers.* Included in Cardamine by Bentham & Hooker, *Gen. Plant.* I. 70.

26. DRABA, L. - - - - - WHITLOW-GRASS.

48 D. incana, L., var. confusa, Poir. Nashwaaksis, *Moser*, Herb. "Cambridge, Sept. 14, 1881.—I have just received a specimen of Draba incana, L., collected by Mr. Charles Lindon of Buffalo, N. Y., in or near Bathurst, N. B.—*Sereno Watson.*"

27. SISYMBRIUM, L. - - HEDGE MUSTARD.

49 S. OFFICINALE, Scop. Streets of Fredericton, *Fowler;* spreading rapidly at St. Stephen, *Vroom.*

28. ERYSIMUM, L. - - - - TREACLE MUSTARD.

50 E. cheiranthoides, L. Campbellton, *Chalmers.*

29. CAMELINA, Crantz. - - - FALSE FLAX.

51 C. SATIVA, Crantz. Among flax, Coal Branch, Kent Co.

30. BRASSICA, Tourn. - - - - MUSTARD.

52 B. SINAPISTRUM, Boissier. (Sinapis arvensis, L.) Troublesome weed, especially in southern counties.

53 B. ALBA, Gray. (Sinapis alba, L.) A rare scape from gardens.

54 B. NIGRA, Koch. (Sinapis nigra, L.) Escaped in a few places. Grand Manan, *Hay*, Herb.

31. CAPSELLA, Vent. - - SHEPHERD'S PURSE.

55 C. BURSA-PASTORIS, Moench. Common weed.

32. SENEBIERA, Poir. - WART-CRESS. SWINE-CRESS.

56 S. DIDYMA, Pers. Spreading from ballast, St. John, *Fowler; Hay*, Herb.

57 S. CORONOPUS, DC. Spreading from ballast, St. John, *Fowler; Hay*, Herb.

33. LEPIDIUM, L. - PEPPERGRASS. PEPPERWORT.

58 L. RUDERALE, L. Naturalized from ballast.

34. CAKILE, Tourn. - - - - SEA-ROCKET.

59 C. Americana, Nutt. Common on sea beaches. Kouchibouguac, *Fowler;* Sheldon's Point, *Hay*, Herb.

35. RAPHANUS, L. - - - - - - RADISH.

60 R. RAPHANISTRUM, L. Troublesome weed in fields at F'ton.

VIII. CISTACEÆ.

36. HUDSONIA, L. - - - - HUDSONIA.

61 H. tomentosa, Nutt. Abundant on Kouchibouguac beach, *Fowler;* Bathurst, *Chalmers.*

37. LECHEA, L. - - - - - PINWEED.

62 L. minor, Lam. Kouchibouguac beach, Goat Island in Grand Lake, *Fowler; Hay*, Herb.; Hopewell, *Brittain.*

IX. VIOLACEÆ.

38. VIOLA, L. - - - VIOLET. HEART'S EASE.

63 V. lanceolata, L. On shore at Rothesay, *Fowler;* Gondola Point and Grand Lake, *Hay*, Herb., Bulletin II. 31; Milkish, *I. Allen Jack;* Lake Utopia, *Wetmore.*

64 V. primulæfolia, L. St. Andrews, *Vroom.*

65 V. blanda, Willd. Very common.

66 V. renifolia, Gray. This plant seems to be common, if the identification is correct. Douglas Road, near Portland, *Wetmore;* Petitcodiac, *Brittain;* St. John, St. Francis and Tobique Rivers, *Hay.*

67 V. Selkirkii, Pursh. Clifton, *Wetmore*, Herb.; near Half Moon Lake, St. John, and St. Francis River, *Hay.* Bulletin II. 25; Eel River, Woodstock, Fredericton, *W. T. L. Reed.*

68 V. cucullata, Ait. Abundant everywhere, and very variable. Fls. sometimes white.

69 V. canina L., var. sylvestris, Regel. Portland and Douglas Road, *Wetmore;* in Herb. *Mrs. Heustis;* St. Stephen, *Vroom;* St. Francis and all along St. John, Grand Manan, *Hay*, Herb.; Bathurst, *Chalmers.*

70 V. Canadensis, L. Near Woodstock, *Chalmers*, Herb.; Richmond, *Hay;* 6 miles below Woodstack, *W. T. L. Reed.*

71 V. pubescens, Ait. Fredericton, *Fowler;* Campbellton, *Hay*, Herb.; rather common on river flats, St. John River, Salmon River and Waterford, *Wetmore;* St. Francis, Eel, Tobique and Kennebeccasis Rivers, *Hay.*

72 V. TRICOLOR, L. Spontaneous in gardens; ballast, St. John, *Hay*, Herb.; escaped near Bathurst, *Chalmers;* spreading from a garden near Tobique Forks, *Hay.*

X. POLYGALACEÆ.

39. POLYGALA, Tourn. - - - - MILKWORT.

73 P. Senega, L. Aroostook Falls and Tobique Narrows, *Hay* and *Wetmore*, Herb. Bulletin II. 22, 29.

74 P. paucifolia, Willd. A specimen in Dr. Bailey's Herb. is labelled "Rushiagonish, Capt. Moody." St. Stephen and Milltown, *Vroom*, Herb.; Fredericton Junction, *Dr. Bailey.*

XI. CARYOPHYLLACEÆ.

40. SAPONARIA, L. - - - - - SOAPWORT.

75 S. OFFICINALIS, L. Queensbury Parsonage, *Dr. Bailey;* shore of Long Reach, *Hay.*

41. SILENE, L. - - - - CATCHFLY. CAMPION.

76 S. INFLATA, Smith. Miramichi, Richibucto, *Fowler;* Restigouche, *Chalmers;* abundant along Upper St. John, *Hay*, Herb. Bulletin II. 28.

77 S. ARMERIA, L. Spontaneous in gardens.

78 S. NOCTIFLORA, L. Weed in cultivated grounds, Bass River, Carleton, *Fowler*, *Hay*, Herb.; common in meadows, Andover, *Wetmore;* spreading along St. John, Salmon and Tobique Rivers, *Hay*.

42. LYCHNIS, Tourn. - - - - - LYCHNIS.

79 L. VESPERTINA, Sibth. St. Stephen, *Vroom*, Herb.

80 L. GITHAGO, Lam. In wheat fields, common.

81 L. FLOS-CUCULI, L. Probably escaped from gardens, Campbellton, *Chalmers*.

43. CERASTIUM, L. - MOUSE-EAR CHICKWEED.

82 C. VISCOSUM, L. Common. Bass River, *Fowler;* St. John, *Hay*, Herb.

83 C. arvense, L. Restigouche and St. John, *Fowler;* St. Francis, near St. Hilaire, *Hay*, Herb. Bulletin II. 28.

44. STELLARIA, L. - CHICKWEED. STARWORT.

84 S. MEDIA, Smith. Abundant everywhere.

85 S. longifolia, Muhl. Fredericton, *Fowler*, Herb.; common at Salmon River, *Wetmore*.

86 S. longipes, Goldie. Pollett River, *Brittain;* Norton, *Hay*, Herb; a reduced form on sand beach at Belledune, *Fowler*.

87 S. uliginosa, Murr. In rills from springs, Kouchibouguac, and Molus River, *Fowler*, Herb.

88 S. crassifolia, Ehrh. Shediac, *Brittain*.

89 S. borealis, Bigel. Rather rare. Bass River, *Fowler*; scarce at Salmon River, *Wetmore*.

90 S. humifusa, Rottboell. Rare. Harvey, York Co., *Fowler*; Shediac, *Brittain*.

45. ARENARIA, L. - - - - - SANDWORT.

91 A. lateriflora, L. Common. Richibucto, Shediac, *Fowler*; St. John Co., *Hay*, Herb.

92 A. peploides, L. Rare. On sandy shore, Shediac, *Fowler*; Dalhousie, *Ross*; Restigouche, *Chalmers*.

46. SAGINA, L. - - - - - - PEARLWORT.

93 S. procumbens, L. Bass River, Kent. Co., *Fowler*; Carleton, *Hay*, Herb.

94 S. nodoza, Fenzl. Sent from Restigouche by *Chalmers*; Pea Point, Charlotte Co., *Hay*, Herb.

47. SPERGULA, L. - - - - - - SPURREY.

95 S. ARVENSIS, L. A pestilent weed in damp soil, Miramichi.

48. SPERGULARIA, Pers. - - SAND-SPURREY.

96 S. rubra, Presl. Fredericton, *Fowler*; Norton, *Hay*, Herb.; Campbellton, *Chalmers.*

97 S. salina, Presl. Sea shore of Kent.

98 S. media, Presl. Salt marshes and sands, Kouchibouguac, *Fowler*; Courtenay Bay, *Hay*, Herb.

XII. PORTULACACEÆ.

49. PORTULACA, Tourn. - - - PURSLANE.

99 P. OLERACEA, L. Troublesome garden weed. Fredericton, Grand Lake, *Fowler*; St. Stephen, *Vroom*; Salmon River, *Wetmore.*

50. CLAYTONIA, L. - - - SPRING-BEAUTY.

100 C. Caroliniana, Michx. Ox-bow, Salmon River, Blackville, *Fowler*, Herb.; Clifton, *Wetmore*; in Herb. *Mrs. Heustis*; Norton, *Hay*, Bulletin II. 32; Sheldon's Point, St. John, *Chalmers.*

101 C. Virginica, L. "Vicinity of Bathurst, N. B. (McGill Coll. Herb.)" Macoun Cat. Can. Plants, p. 82. Have not seen it.

51. MONTIA, L.

102 M. fontana, L. "Sepals 2, rarely 3, persistent, suborbicular. Petals 5, hypogynous, unguiculate, with the claws a little connate; 3 of them somewhat smaller. Stamens 3, inserted on the claws of the smaller petals, very rarely 4 or 5. Styles very short, almost separate, spreading. Capsule 3-valved, 3-seeded. Seeds turgid, minutely tuberculate, large. A very small glabrous procumbent rather fleshy herb, growing in water or wet places. Leaves opposite, spatulate. Raceme few-flowered, terminal." Torr. & Gr. Fl. I. 202. Shediac, *Brittain.*

XIII. HYPERICACEÆ.

52. HYPERICUM, L. - - - ST. JOHN'S-WORT.

103 H. PERFORATUM, L. Kouchibouguasis, Bass River, *Fowler*; St. John and King's Counties, *Hay*, Herb.

104 H. ellipticum. Kouchibouguac, Norton, *Fowler*, *Hay*, Herb.

105 H. mutilum, L. Kouchibouguac, *Fowler*; Norton, *Hay*, Herb.; Carleton, Herb. *Mrs. Heustis.*

106 H. Canadense, L. Richibucto, *Fowler*; Carleton, *Hay*, Herb. Var. major, Gray. Rare. Bass River.

53. ELODES, Adans. - MARSH ST. JOHN'S-WORT.

107 E. Virginica, Nutt. Kouchibouguac, St. John, *Fowler*; St. John County, *Hay*, Herb.

XIV. MALVACEÆ.

54. MALVA, L. - - - - - MALLOW.

108 M. ROTUNDIFOLIA, L. Bass River, Richibucto, *Fowler*; Carleton, *Hay*, Herb.

109 M. SYLVESTRIS, L. Escaped from gardens in a few places.

110 M. CRISPA, L. Beside dwellings, Bass River.

111 M. MOSCHATA, L. Spontaneous in gardens, Bass River, *Fowler;* Campbellton, Herb.

55. HIBISCUS, L. - - - - ROSE-MALLOW.

112 H. TRIONUM, L. A rare garden weed, Kingston, Kent Co.

XV. TILIACEÆ.

56. TILIA, L. - LINDEN. BASS-WOOD. LIME-TREE.

113 T. Americana, L. Woodstock and Grand Lake, *Fowler;* shore of Long Reach, Lower Nerepis, Carleton, *Hay*, Herb.

XVI. GERANIACEÆ.

57. GERANIUM, L. - - - - - CRANESBILL.

114 G. PRATENSE, L. Near St. John. Probably a garden scape.

115 G. Carolinianum, L. Bass River, Salmon River, *Fowler;* Grand Lake, *Hay*, Herb.

116 G. Robertianum, L. Quaco Cliffs, University Herb.; Lower Norton, *Arthur I. Trueman*, Herb.; Sugar Loaf at Clifton and Minister's Face, *Wetmore*, *Hay*.

58. ERODIUM, L'Her. - - - STORKSBILL.

117 E. CICUTARIUM, L'Her. Ballast, Carleton, *Hay*, Herb.

59. OXALIS, L. - - - - - - WOOD-SORREL.

118 O. Acetosella, L. Abundant everywhere in deep woods. A variety on Bald Mt., Tobique, with light purple flowers, *Hay.*

119 O. corniculata, L., var. stricta, Sav. Common. Coal Branch, Kent Co., *Fowler;* Quispamsis, *Hay,* Herb.; Carleton, Herb. *Mrs. Heustis.*

60. IMPATIENS, L. - BALSAM. JEWEL-WEED.

120 I. fulva, Nutt. Common. Kouchibouguac, Bass River, Miramichi, St. John, *Fowler;* Grand Lake, *Hay,* Herb.

121 I. pallida, Nutt. "Found by *Dr. Bailey* and *W. T. L. Reed* 1 mile below Andover, and on E. side of the river, near St. Leonard's, August 10, 1884," *Vroom in litt.;* Richmond, Carleton Co., Aug. 13th, 1884, *Hay.*

XVII. ILICINEÆ.

61. ILEX, L. - - - - - - - HOLLY.

122 I. verticillata, Gray. Kouchibouguac and St. John, *Fowler;* Brookville, *Hay,* Herb.

62. NEMOPANTHES, Raf. - MOUNTAIN HOLLY.

123 N. Canadensis, DC. Rather scarce. Kouchibouguac, Bass River, *Fowler;* Brookville and Norton, *Hay,* Herb.

XVIII. RHAMNACEÆ,

63. RHAMNUS, Tourn. - - - BUCKTHORN.

124 R. alnifolius, L'Her. Mouth of Eel River, Restigouche Co., near Green Head, St. John Co., *Fowler;* St. Francis River, *Hay,* Herb., Bulletin II. 24; Petitcodiac, *Brittain.*

XIX. VITACEÆ.

64. VITIS, Tourn. - - - - - - GRAPE.

125 V. riparia, Michx. Banks of St. John River near Fredericton and Grand Lake, *Fowler, Hay,* in Herb.

XX. SAPINDACEÆ.

65. ÆSCULUS, L. - - - - HORSE-CHESTNUT.

126 Æ. HIPPOCASTANUM, L. Planted for ornament.

66. ACER, Tourn. - - - - - - MAPLE.

127 A. Pennsylvanicum, L. Bass River. Common in Kent.

128 A. spicatum, Lam. Common in damp woods.

129 A. saccharinum, Wang. Abundant in forests.

130 A. dasycarpum, Ehrh. Rather rare. Have not seen it in northern counties. Harris Cove, Kennebeccasis, Fredericton, Mouth of Nashwaaksis, Shore of Grand Lake, *Fowler;* Keswick, *Hay.*

131 A. rubrum, L. Common forest tree.

XXI. ANACARDIACEÆ.

67. RHUS, L. - - - - - - - SUMACH.

132 R. typhina, L. Common. Bass River, Kouchibouguac, *Fowler;* Grand Manan, *Hay*, Herb.

133 R. Toxicodendron, L. Woodstock, Kouchibouguac, *Fowler;* common on St. John and tributaries, Jemseg, *Hay*, Herb.

XXII. LEGUMINOSÆ.

68. MEDICAGO, L. - - - - - - MEDICK.

134 M. LUPULINA, L. Naturalized in several places.

135 M. MACULATA, Willd. Introduced in ballast, Carleton, *Hay*, Herb.

136 M. DENTICULATA, Willd. Introduced, Buctouche, St. John.

69. MELILOTUS, Tourn. - - SWEET CLOVER.

137 M. OFFICINALIS, Willd. Escaped in a few places. Norton, *Hay*, Herb.

138 M. ALBA, Lam. Richibucto, *Fowler;* Woodstock, *Hay*, Herb.

70. TRIFOLIUM, L. - - CLOVER. TREFOIL.

139 T. ARVENSE, L. Richibucto, along the railway track, St. John, *Fowler;* Lever Settlement, Charlotte Co., *Vroom;* Lancaster and Torryburn, *Hay*, Herb.

140 T. PRATENSE, L. Extensively cultivated.

141 T. repens, L. *White Clover.* Everywhere.

142 T. agrarium, L. Queensbury, *Dr. Bailey;* Fredericton, *Vroom;* Carleton, *Mrs. Heustis;* Salmon River, *Wetmore;* abundant along N. B. Railway between St. John and Vanceboro, Sackville, *Hay*, Herb.

143 T. procumbens, L. Richibucto, *Fowler;* Petitcodiac, *Mrs. Heustis;* Grand Manan, St. Andrews, Prince William, Norton, *Hay*, Bulletin II. 31.

144 T. hybridum, L. St. Stephen, frequent, *Vroom;* Norton, *Hay*, Herb.

71. ROBINIA, L. - - - - - LOCUST-TREE.

145 R. PSEUDACACIA, L. Frequently planted.

146 R. VISCOSA, Vent. Frequently planted.

72. ASTRAGALUS, L. - - - - MILK-VETCH.

147 A. alpinus, L. Nepisiquit River, *Fowler;* Petitcodiac, *Brittain;* abundant on Upper St. John, Madawaska, *Hay*, Herb., Bulletin II. 27; "Tobique Village, *Dr. Bailey;* Mouth of Aroostook," *Vroom in litt.*

73. OXYTROPIS, L.

148 O. campestris, DC. Islands of St. John River, *Dr. Bailey;* Edmundton and along banks of Upper St. John, Mouth of Tobique, *Hay*, Herb., Bulletin II. 27.

74. HEDYSARUM, Tourn.

149 H. boreale, Nutt. Near Pabineau Falls on Nepisiquit River, *Fowler;* Grand Falls of St. John, *Moser;* abundant on Upper St. John, rarer on Tobique, Eel and other tributaries, Edmundton, *Hay*, Herb.

75. DESMODIUM, DC. - - - - TICK-TREFOIL.

150 D. Canadense, DC. Opposite Fredericton, *Fowler;* Queensbury, *Hay*, Herb.; along Hammond River, *Brittain.*

76. VICIA, L. - - - - - VETCH. TARE.

151 V. SATIVA, L., var. angustifolia, Gray. Occasionally found in fields or on roadsides. Richibucto, *Fowler;* New Mills, Herb.; Tobique River, *Hay.*

152 V. HIRSUTA, Koch. Along the I. C. R. near St. John.

153 V. Cracca, L. Restigouche, *Fowler;* Grand Lake, *Hay*, Herb.; abundant at Andover, *Wetmore.*

154 V. TETRASPERMA, L. Along I. C. R. near St. John, *Fowler, Hay*, Herb.; Petitcodiac, *Brittain.*

155 V. Americana, Muhl. Belledune, *Chalmers.*

77. LATHYRUS, L. - VETCHLING. EVERLASTING PEA.

156 L. maritimus, Bigelow. Sea coast, Richibucto, St. John, *Fowler;* Hopewell Cape, *Hay*, Herb.

157 L. palustris, L. St. John, *Hay*, Herb.
var. myrtifolius, Gray. Fredericton, Hampton, Kouchibouguac, *Fowler;* St. John, *Hay*, Herb.

78. AMPHICARPÆA, Ell. - - HOG PEA-NUT.

158 A. monoica, Nutt. St. John River near Fredericton, *Fowler;* Petitcodiac, *Brittain;* Upper St. Croix, *Vroom;* Andover, *Hay*, *Wetmore*, Bulletin II. 30; Harris Cove, *Fowler*.

79. APIOS, Boerhaave. - - - GROUND-NUT.

159 A. tuberosa, Moench. St. John River opposite Fredericton and Keswick Ridge, *Fowler;* Upper St. Croix and St. Stephen, *Vroom*, Herb.; Nashwaak, *Moser*.

XXIII. ROSACEÆ.

80. PRUNUS, Tourn. - - - PLUM. CHERRY.

160 P. pumila, L. Grand Lake, *Fowler*, *Hay;* St. John, Tobiqne and Kennebeccasis Rivers, Drury's Cove, *Hay*, Herb., Bulletin II. 28, 32; Restigouche River, University Herb.; Tobique River, *Wetmore*.

161 P. Pennsylvanica, L. Very common. St. John, *Hay*, Herb.

162 P. Virginiana, L. Common along rivers.

163 P. serotina, Ehrh. Oxbow, Salmon River, *Fowler;* Norton, *Hay*, Herb.

81. SPIRÆA, L. - - - - MEADOW-SWEET.

164 S. salicifolia, L. Common. Kouchibouguac, Richibucto, Miramichi, *Fowler;* Jemseg, *Hay*, Herb.; Indian Falls of Nepisiquit, *Dr. Bailey*, Can. Nat. 1864, p. 92.

165 S. tomentosa, L. Near Napan on Richibucto road, *Fowler;* Petitcodiac, Herb. *Mrs. Heustis;* St. John and King's Counties, *Hay*, Herb., Bulletin II. 32; White fls., Jackson Settlement, Charlotte County, *Vroom;* common at Salmon River, *Wetmore*,

82. RUBUS, Tourn. - - . . BRAMBLE.

166 R. odoratus, L. Old Gardens, Chamcook, Charlotte Co., *Hay*, Herb. Not known truly wild.

167 R. Dalibarda, L. (Dalibarda repens, L.) Not rare in dry woods in Kent Co., *Fowler;* Madawaska, Bocabec, *Hay*, Herb.

168 R. Chamæmorus L. Peat bogs, Kent Co., *Fowler;* St. John, *Matthew*; Point Lepreaux, *Hay*, Herb.; Herring Cove, Campobello, *Vroom*.

169 R. triflorus, Richardson. Common. Lancaster, *Mrs. Heustis;* Bass River, Kouchibouguac, *Fowler;* Norton, *Hay*, Herb.

170 R. strigosus, Michx. Abundant on burnt waste land everywhere.

171 R. occidentalis, L. Keswick, *Hay*. *Moser*, *Fowler*; said to occur in Westmoreland; Richmond, *Hay*.

172 R. villosus, Ait., var. frondosus, Torrey. Common. Kouchibouguac, *Fowler;* Nerepis, Herb. *Mrs. Heustis;* Grand Lake, *Hay*, Herb.

173 R. Canadensis, L. Bass River, *Fowler*.

174 R. hispidus, L. Near Weldford Station, Fredericton; Grand Lake, *Hay*.

83. GEUM, L. - - - - - - - AVENS.

175 G. album, Gmelin. Not reported from Northern Counties. Woodstock, *Fowler;* Keswick Ridge, *Moser*; St. John and Kennebeccasis Rivers, *Hay*, Herb., near St. Hilaire, *Hay*. Bulletin II. 28. Eel River, York Co., *Hay*. Bulletin II. 30; common about Hampton, *Brittain;* Andover, *Wetmore*.

176 G. Virginicum, L. Hampton and Petitcodiac, *Brittain*, Herb.; Salmon River, *Wetmore*; Norton, *Hay*.

177 G. macrophyllum, Willd. Hudson's Brook, Kent Co.; Lily Lake St. John Co., *Fowler;* Salmon Creek, *Wetmore*.

178 G. strictum, Ait. Fredericton, *Fowler;* common about Andover, *Wetmore*; Sussex and Apohaqui, *Brittain*.

179 G. rivale, L. St. John and King's Counties, *Hay*, Herb.; Kouchibouguac, Richibucto River, *Fowler*.

84. WALDSTEINIA, Willd. BARREN STRAWBERRY.

180 W. fragarioides, Tratt. Eel River, Carleton Co., *Hay*.

85. FRAGARIA, Tourn. - - - STRAWBERRY.

181 F. Virginiana, Ehrh. Common everywhere.

182 F. vesca, L. Rare at Bass River, *Fowler*; St. John County, *Hay*, Herb. Bulletin II. 32; common at Andover, *Wetmore*.

86 POTENTILLA, L. CINQUE-FOIL, FIVE-FINGER.

183 P. Norvegica, L. Kouchibouguac, *Fowler;* Lancaster, *Hay*, Herb.

184 P. Canadensis, L., var. simplex, Torr & Gray. Rather common. Kouchibouguac, *Fowler*, Herb.; Nerepis, *Mrs. Heustis*.

185 P. argentea, L. Chamcook Mountain, Norton, *Hay.*

186 P. arguta, Pursh. Keswick Ridge, *Moser;* Indian Falls of Nepisiquit, *Dr. Bailey*, Can. Nat. 1864, p. 92; Grand Falls, l. c. p. 93.

187 P. Anserina, L. Common on brackish marshes and river banks.

188 P. fruticosa, L. Rothesay, *Fowler;* Madawaska and rare along Upper St. John, *Hay*, Herb.

189 P. tridentata, Ait. Buctouche, Carleton, *Fowler;* Sugar Loaf, Restigouche, *Chalmers;* Nerepis, Upper St. John, Head Waters of Tobique, Douglas Mountain, *Hay*, Herb., Bulletin II. 32.

190 P. palustris, Scop. Rather common, Lancaster, *Hay*, Herb.

87. AGRIMONIA, Tourn. - - - - AGRIMONY.

191 A. Eupatoria, L. Canaan, Kent Co., *Fowler;* Campbellton, St. John River, *Hay*, Herb.

88. ROSA, Tourn. - - - - - - - - ROSE.

192 R. Carolina, L. Common throughout the Province.

193 R. parviflora, Ehrh. (R. lucida, Gray, Manual, 158) Common. Bass River, Kouchibouguac, *Fowler;* Lancaster, *Hay*, Herb.

194 R. blanda, Ait. Petitcodiac, *Brittain*, Herb.; Tobique River, *Hay.*

195 R. RUBIGINOSA, L., Common about garden fences.

89. PYRUS, L. - - - - - PEAR. APPLE.

196 P. arbutifolia, L., var. melanocarpa, Hook. Bass River, Kouchibouguac, Miramichi, *Fowler;* St. John, Herb. *Mrs. Heustis; Hay*, Herb.

197 P. Americana, DC. Common. Often planted.

90. CRATÆGUS, L. - HAWTHORNE, WHITE THORN.

198 C. OXYACANTHA, L. Frequently planted for hedges and beside fences.

199 C. tomentosa, L. Rather common. *Brittain* sends it from Pollet River with pink fls.

var. pyrifolia, Gray. Some fine specimens along the road at Government House, Fredericton.

91 AMELANCHIER, Media. JUNE-BERRY. SHAD-BUSH.

200 A., Canadensis, Torr & Gray. Abundant throughout the Province.

var. oblongifolia, Torr. & Gray. Rather rare. Bass River, Blackville, *Fowler*; Campbellton, *Hay*, Herb.; St. John, *Mrs. Heustis.*

var. oligocarpa, Gray. Common in damp woods. Bass River, *Fowler;* Carleton, *Mrs. Heustis; Hay*, Herb.

XXIV. SAXIFRAGACEÆ.

92 SAXIFRAGA, L. - - - - SAXIFRAGE.

201 S. Aizoon, Jacq. On wet rocks opposite Rothesay, Herb. *Dr. Bailey;* near St. John, *Trueman*, Herb.; Narrows, St. John, and Minister's Face, *Wetmore*, *Hay.*

202 S. Virginiensis, Michx. York Co., Herb. *Dr. Bailey;* Mouth of Mactaquac, *Vroom.*

93. TIARELLA, L. - - - FALSE MITRE-WORT.

203 T. cordifolia, L. Lewy's Island, St. Croix River. Com. about Fredericton, *Fowler;* Norton and Tobique, *Hay*, Herb.; Herb. *Mrs. Huestis;* Tobique, near Pokiok, *Dr. Bailey*, Can. Nat. 1864, p. 86.

94. MITELLA, Tourn. - MITRE-WORT. BISHOP'S-CAP.

204 M. nuda, L. Kouchibouguac, Miramichi, *Fowler;* St. John and King's, *Hay*, Herb.; Carleton, *Mrs. Huestis;* Cedar Brook on Tobique, *Dr. Bailey*, Can. Nat. 1864, p. 86.

95. CHRYSOSPLENIUM, Tourn. GOLDEN SAXIFRAGE.

205 C. Americanum, Schwein. Common. Bass River, St. John.

96. PARNASSIA, Tourn. - - GRASS OF PARNASSUS.

206 P. Caroliniana, Michx. York Co., *Dr. Bailey;* Tobique Narrows and Andover, *Wetmore;* near mouth St. John, *Hay*, Herb.; Flat Lands, Restigouche, *Chalmers*; Banks of St. John River, just above mouth of Aroostook, *Vroom.*

97. RIBES, L. - - CURRANT. GOOSEBERRY.

207 R. Cynosbati, L. Specimen from Rev. (now Dr.) J. P. Sheraton, Black Lake, St. John.

208 R. oxyacanthoides, L. (R. hirtellum, Michx.) Common.

209 R. lacustre, Poir. Rather common.

210 R. prostratum, L'Her. Common.

211 R. floridum, L. St. John.

212 R. rubrum, L. Kouchibouguac, *Fowler;* Norton, *Hay*, Herb.; Feldspar Mountain on Nepisiquit, *Dr. Bailey*, Can. Nat. 1864, p. 91.

XXV. CRASSULACEÆ.

98. SEDUM, Tourn. - - STONE-CROP. ORPINE.

213 S. ACRE, L. Escaped from gardens in a few places. Hampton, *Brittain*, Herb.; Norton, *Hay.*

214 S. TELEPHIUM, L. Becoming a troublesome weed in some parts of St. John and King's Co's.

215 S. Rhodiola, DC. On exposed sea cliffs, St. John Co., *Fowler;* Minister's Face, *Wetmore;* St. George, 5 miles from coast, *Vroom*, Bulletin II. 32.

99. PENTHORUM, L. - - DITCH STONE-CROP.

216 P. sedoides, L. Norton and Jemseg, *Hay;* Fredericton, University Herb.

XXVI. DROSERACEÆ.

100. DROSERA, L. - - - - - SUN-DEW.

217 D. rotundifolia, L. Common. Black River, Northumberland Co., Bass River, *Fowler;* Lily Lake, *Hay*, Herb.

218 D. intermedia, Drev & Hayne, var. Americana, DC. (D. longifolia, L.) Lake Elsie, near Richibucto, *Fowler;* St. John Co., *Hay;* Herb. *Mrs. Heustis.*

XXVII. HAMAMELACEÆ.

101. HAMAMELIS, L. - - - WITCH-HAZEL.

219. H. Virginiana, L. Bass River, *Fowler*, Herb.; shores of Kennebeccasis, Bulletin II. 32, Grand Lake, *Hay*, Herb.; Petitcodiac, *Brittain.*

XXVIII. HALORAGEÆ.

102. PROSERPINACA, L. - - MERMAID-WEED.

220 P. palustris, L. Rare. Digdeguash and St. Patrick, *Vroom*, Bulletin III. 33.

103. HIPPURIS, L. - - - - - MARE'S-TAIL.

221 H. vulgaris, L. Rare. St. John, Shediac, Dorchester, *Fowler;* Digdeguash, *Vroom.*

104. MYRIOPHYLLUM, Vaill. - WATER-MILFOIL.

222 M. spicatum, L. Kouchibouguac, Bass River, Kennebeccasis, *Fowler;* Petitcodiac, *Brittain*; Tobique River, *Hay.*

223 M. tenellum, Bigelow. Have only seen it in Lake Elsie, near Richibucto.

105. CALLITRICHE, L.

224 C. verna, L. Common in stagnant water, ditches, etc. Kouchibouguac, Miramichi, Kent, *Fowler*; Spurr's Cove, Carleton Co., *Hay.*

225 C. autumnalis, L. In a pond at Rothesay Station.

XXIX. ONAGRACEÆ.

106. EPILOBIUM, L. - - - WILLOW-HERB.

226 E. spicatum, Lam. (E. angustifolium, L.) Abundant everywhere on recently burned land.

227 E. palustre, L., var. lineare, Gray. Rather common. Kouchibouguac, Richibucto, *Fowler*; Spurr's Cove, *Hay*, Herb.

228 E. coloratum, Muhl. Kouchibouguac, *Fowler*; St. John Co., *Hay*, Herb.

107. LUDWIGIA, L. - - FALSE LOOSESTRIFE.

229 L. palustris, Ell. Ditches, Fredericton, *Fowler*; St. Stephen, *Vroom*, Herb.; Petitcodiac, Nauwigewauk, Taborville, *Brittain*; Nashwaaksis, *Moser.*

108. ŒNOTHERA, L. - - EVENING PRIMROSE.

230 Œ. biennis, L. Common. Kouchibouguac, Richibucto, St. John, *Fowler*; Norton, *Hay,* Herb. The vars. have not been worked out.

231 Œ. pumila, L. Bass River, *Fowler;* near St. John, *Hay*, Herb.

109. CIRCÆA, Tourn. - ENCHANTER'S NIGHTSHADE.

232 C. Alpina L. Com. Richibucto, *Fowler*; Brookville, *Hay*, Herb.

233 C. Lutetiana, L. Queensbury, Herb., *Dr. Bailey*; Lower Norton, *Brittain*; Eel River, York Co., Richmond, Upper St. John, Keswick Ridge, *Hay*, Herb.; Andover, *Wetmore.*

XXX. CUCURBITACEÆ.

110. ECHINOCYSTIS, Torr. & Gray. WILD BALSAM-APPLE.

234 E. lobata, Torr. & Gr. Intervales and Islands at the mouth of the Keswick, *Moser*, *Hay*, Herb.

XXXI. FICOIDEÆ.

111. MOLLUGO, L. - - INDIAN CHICKWEED.

235 M. verticillata, L. Shore near residence of Walter S. Butler, Esq., Grand Lake. *Fowler*, *Hay*, Herb.

XXXII. UMBELLIFERÆ.

112. HYDROCOTYLE, Tourn. WATER PENNYWORT.

236 H. Americana, L. Common. Bass River, *Fowler*; Spurr's Cove, Tobique River, *Hay*, Herb.

113. SANICULA, Tourn. - BLACK SNAKEROOT.

237 S. Canadensis, L. Lower Norton and Sussex, *Brittain*, Herb.

238 S, Marilandica, L. Bass River, Woodstock, *Fowler*; Tobique, near Pokiok, *Dr. Bailey*, Can. Nat. 1864, p. 83; Campbellton, *Chalmers*, *Hay*, Herb.; Salmon River and Andover, *Wetmore;* abundant on Upper St. John and tributaries, *Hay*, Bulletin II. 25.

114. CICUTA, L. - - - WATER-HEMLOCK.

239 C. maculata, L. Abundant in Kent Co., *Fowler;* Campbellton and St. John Co., *Hay*, Herb. The root is a deadly poison.

240 C. bullifera, L. In wet places, Bass River.

115. SIUM, L. - - - - WATER-PARSNIP.

241 S. cicutæfolium, Gmelin. (S. lineare, Michx.) Common. Kouchibouguac, Weldford, *Fowler;* Norton, Long Reach, *Hay*, Herb.

116. CRYPTOTENIA, DC. - - - HONEWORT.

242 C. Canadensis, C. Woodstock, *Fowler;* Mouth of Tobique, *Hay*, *Wetmore;* Sussex, *Brittain.*

117. OSMORRHIZA, Raf. - - SWEET CICELY.

243 O. longistylis, DC. Woodstock, *Fowler;* Pollet River near Petitcodiac, *Brittain.*

244 O. brevistylis, DC. Coal Branch, Bass River, *Fowler;* Quispamsis, *Hay*, Herb.

118. ÆTHUSA, L. - - - FOOL'S-PARSLEY.

245 Æ. CYNAPIUM, L. A plant from Kingston in the Univers. Herb. bears this label. No other specimen has been reported.

119. LIGUSTICUM, L. - - - - LOVAGE.

246 L. Scoticum, L. Near salt water on banks and rocks, Kent Co., *Fowler;* coast near St. John, *Hay.*

120. THASPIUM, Nutt. - - MEADOW-PARSNIP.

247 T. aureum, Nutt. Along the St. John River near Woodstock, *Fowler*, *Hay;* Rothesay, *Hay*, Herb.

121. SELINUM, L. - - - HEMLOCK-PARSLEY.

248 S. Canadense, Michx., (Conioselinum Canadense, Torr. & Gr.) Bass River, *Fowler;* Spurr's Cove, St. John, *Hay*, Herb.

122. ARCHANGELICA, Hoffm.

249 A. atropurpurea, Hoffm. Bartibog, Northumberland Co., *Fowler;* Harris Cove on the Kennebeccasis, *Matthew.*

250 A. Gmelini, DC. East side of Courtenay Bay, St. John, *Fowler*, *Hay*, Herb.

123. PASTINACA, Tourn. - - - PARSNIP.

251 P. SATIVA, L. Escaped from gardens in some places. This genus is included in Peucedanum by Benth. & Hooker.

XXXIII. ARALIACEÆ.

124. ARALIA, Tourn. - GINSENG. WILD SARSAPARILLA.

252 A. racemosa, L. Not common. Bass River, Molus River, *Fowler;* Upper St. John and branches, Norton, *Hay*, Herb., Bulletin II. 32.

253 A. hispida, Michx. Abundant in dry burnt woods in Kent, *Fowler;* Campbellton and St. John Co., *Hay*, Herb.

254 A. nudicaulis, L. Miramichi, Kouchibouguac, St. John, *Fowler*, *Hay*, Herb.; Carleton, Herb. *Mrs. Heustis;* Bald Mountain on Tobique, *Dr. Bailey*, Can. Nat. 1864, p. 87, between Pabineau and Grand Falls, l. c. p. 94.

255 A. trifolia, Gray. Hudson's Brook, Kent Co., *Fowler;* Nashwaaksis, *Vroom*, Herb.; Salmon Creek and Salmon River, *Wetmore.*

XXXIV. CORNACEÆ.

125. CORNUS, Tourn. - - CORNEL. DOGWOOD.

256 C. Canadensis, L. Abundant throughout the Province.

257 C. circinata, L'Her. Weldford, *Fowler;* Upper St. John, Andover, *Hay*, Herb.; Petitcodiac, *Brittain*, Bulletin II. 32.

258 C. sericea, L. Hudson's Brook, Kent Co.

259 C. stolonifera, Michx. Fredericton, *Fowler;* Fairville, *Hay*, Herb.; Mosquito Cove, Herb. *Mrs. Heustis;* Tobique near Pokiok, *Dr. Bailey*, Can. Nat, 1864, p. 83, Cedar Brook, p. 86.

260 C. alternifolia, L. Bass River, Molus River, Kent Co., Woodstock, Grand Lake.

DIVISION B.—GAMOPETALÆ.

XXXV. CAPRIFOLIACÆ.

126. SAMBUCUS, Tourn. - - - - - ELDER.

261 S. racemosa, L. (S. pubens, Michx.) Rather common. Kouchibouguac, Bass River, *Fowler;* Norton, *Hay*, Herb.; Lancaster, Herb. *Mrs. Heustis;* Island in Nictau Lake, *Dr. Bailey*, Can. Nat. 1864, p. 88.

262 S. Canadensis, L. Rather common. Kouchibouguac, Fredericton, *Fowler;* Norton, *Hay*, Herb.

127. VIBURNUM, L. - - - - ARROW-WOOD.

263 V. lantanoides, Michx. Very common in Kent, *Fowler;* St. John, *Hay*, Herb.; Green Head, Herb. *Mrs. Heustis.*

264 V. Opulus, L. On intervales, Bass River, *Fowler*, Herb.; Upper St. John and Madawaska, *Hay;* Westfield, Herb. *Mrs. Heustis;* Tobique near Pokiok, *Dr. Bailey*, Can. Nat. 1864, p. 83, Cedar Brook, l. c. p. 86.

265 V. pauciflorum, Pylaie. Tay's Mills, York Co., *Moser;* Tobique, *Hay.*

266 V. dentatum, L. Chiputneticook Falls and St. Stephen, *Vroom*, Herb.

267 V. cassinoides, L. (V. nudum, var. cassinoides, Torr. & Gr.) Common throughout the Province. Howe's Road, *Hay*, Herb.

268 V. Lentago, L. Chiputneticook Falls, Charlotte Co., *Vroom.*

128. SYMPHORICARPUS, Dill. - SNOWBERRY.

269 S. racemosus, Michx. Common in cultivation.

129. LINNÆA. Gronov. - LINNÆA. TWIN-FLOWER.

270 L. borealis, Gronov. Common. Kouchibouguac, Kent Co., *Fowler;* St. John, *Hay*, Herb.; Green Head, Herb. *Mrs. Heustis;* Cedar Brook on Tobique, *Dr. Bailey*, Can. Nat. 1864, p. 86, Feldspar Mountain on Nepisiquit, l. c. p. 91, between Pabineau and Grand Falls, l. c. p. 94.

130. LONICERA, L. - HONEYSUCKLE. WOODBINE.

271 L. cærulea, L. In swamps. Kouchibouguac, Weldford, Kent Co., Black River, Northumberland Co., *Fowler;* Salmon River, *Wetmore;* St. John, *Hay*, Herb.; Green Head, Herb. *Mrs. Heustis.*

272 L. ciliata, Muhl. Bass River, *Fowler;* Carleton, *Hay*, Herb.; Green Head, Herb. *Mrs. Heustis.*

273 L. involucrata, Banks. Campbellton, *Chalmers.*

131. DIERVILLA, Tourn. - BUSH-HONEYSUCKLE.

274 D. trifida, Moench. Rather common. Kouchibouguac, Hampton, *Fowler;* Lancaster, *Hay*, Herb.; Indian Falls, Nepisiquit, *Dr. Bailey*, Can. Nat. 1864, p. 92.

XXXVI. RUBIACEÆ.

132. CEPHALANTHUS, L. - - BUTTON-BUSH.

275 C. occidentalis, L. St. Stephen and St. James, *Vroom..*

133. HOUSTONIA, L, - - - - BLUETS.

276 H. cœrulea, L. Very abundant in some parts of St. John Co.; have not noticed it farther north. Rothesay, *Fowler;* Kennebeccasis, *Hay*, Herb.; Herb. *Mrs. Heustis.*

134. MITCHELLA, L, - - PARTRIDGE-BERRY.

277 M. repens, L. Kouchibouguac, Bass River, Fredericton, *Fowler;* St. John and King's, *Hay*, Herb.

135. GALIUM, L. - - BEDSTRAW. CLEAVERS.

278. G. MOLLUGO, L. Spreading from ballast, Richibucto, *Fowler;* St. John, *Hay*, Herb.

279 G. APARINE. Introduced in ballast, Carleton, *Fowler;* St. John, *Hay*, Herb.; Petitcodiac, *Brittain.*

280 G. trifidum, L., var. pusillum, Gray. In sphagnous bogs, Richibucto, Lily Lake, *Fowler;* St. John, *Hay*, Herb.

var. latifolium, Torr. St. John, *Hay*, Herb.

281 G. asprellum, Michx. Common. Kouchibouguac, Bass River, *Fowler;* St. John Co., *Hay*, Herb.

282 G. triflorum, Michx. Kouchibouguac, *Fowler;* Norton, *Hay*, Herb.

XXXVII. VALERIANACEÆ.

136. VALERIANA, Tourn. - - - VALERIAN.

283 V. sylvatica, Banks. Richmond, Carleton Co., *Vroom;* Arthurette, *Wetmore;* Tobique, *Hay.*

XXXVIII. COMPOSITÆ.

137. EUPATORIUM, Tourn. - THOROUGHWORT.

284. E purpureum, L. Rather common along streams. Black River, Northumberland Co., *Fowler;* Norton, *Hay*, Herb.

285 E. perfoliatum, L. Common in Kent Co., *Fowler;* St John River and tributaries, *Hay*, Herb.

286 E. ageratoides, L. Banks of the Restigouche, *Fowler;* St. John River and Campbellton, *Hay*, Herb.; Andover, *Wetmore.*

138. SOLIDAGO, L. - - - - - GOLDEN-ROD.

287 S. squarrosa, Muhl. Kouchibouguac, *Fowler;* Harris Cove, *Matthew;* abundant east side St. John River, between Grand Falls and Tobique, *Hay;* Andover, *Wetmore;* Restigouche, *Chalmers.*

288 S. latifolia, L. Kouchibouguac, Bass River, Point LeNim in Restigouche Co., Fredericton, *Fowler;* Lancaster, *Hay*, Herb.; Mouth of Aroostook, *Vroom.*

289 S. bicolor. L. Abundant in barrens along the Richibucto River, Kouchibouguac, *Fowler;* Norton and Tobique, *Hay*, Herb.

var. concolor, Torr. & Gr. Tattagouche River, *Chalmers*, Herb.

290 S. macrophylla, Pursh. (S. thyrsoidea, E. Meyer.) Bass River, *Fowler;* Petitcodiac, *Brittain;* Campbellton, *Chalmers.*

291 S. sempervirens, L. Salt marshes. Buctouche, *Fowler;* Courtenay Bay and Taylor's Island, *Hay*, Herb.

292 S. puberula, Nutt. Abundant in burnt barrens along the Richibucto River, *Fowler;* "A glabrate and ambiguous form," Gray. Syn. Fl.; abundant in St. John Co.; St. Stephen, *Vroom.*

293 S. uliginosa, Nutt. (S. stricta, Gray's Manual, p. 240.) In wet barrens along the Richibucto River, Kouchibouguac, *Fowler.*

294 S. speciosa, Nutt. St. Stephen, *Vroom.*

295 S. rugosa, Mill. (S. altissima, Torr. & Gr.) Abundant along fences and roadsides, Kent Co., *Fowler;* Norton, *Hay*, Herb.; St. John, Herb. *Mrs. Heustis.*

296 S. neglecta, Torr. & Gr. In swamps and bogs. St. John Co., *Hay.*

297 S. juncea, Ait. (S. arguta, Torr. & Gr.) Smithtown, K. C., *Brittain;* near St. John, *Hay;* St. Stephen, Woodstock, *Vroom*, Bulletin III. 33.

298 S. serotina, Ait. (S. gigantea, Gray's Manual, p. 245.) Restigouche, *Fowler;* St. John and King's Co.'s, *Hay*, Herb.; Fredericton, *Moser;* Digdeguash, *Hay.*

299 S. Canadensis, L. Abundant in Kent, King's and St. John Co.'s, *Fowler;* Norton, *Hay*, Herb.

300 S. nemoralis, Ait. The most abundant Solidago in western part of Charlotte Co., *Vroom*, Herb.

301 S. lanceolata, L. Very abundant in Kent Co., *Fowler;* Norton, *Hay*, Herb.

139. ASTER, Tourn. - - ASTER. STARWORT.

302 A. macrophyllus, L. Kouchibouguac, Bass River, St. John, *Fowler;* Torryburn, *Hay*, Herb.

303 A. radula, Ait. Kouchibouguac, Richibucto, Bass River, *Fowler;* St. John, *Hay*, Herb.

304 A. undulatus, L. Reported from Petitcodiac by *Brittain.* Have not seen it.

305 A. cordifolius, L. Bass River, *Fowler;* Petitcodiac, *Brittain;* Carleton, Herb. *Mrs. Heustis.*

306 A. sagittifolius, Willd. Petitcodiac, *Brittain.* Have not seen it.

307 A. Lindleyanus, Torr. & Gr. Petitcodiac, *Brittain.* An interesting discovery.

308 A. diffusis, Ait. (A. miser, Gray, Manual.) Abundant in Kent Co., *Fowler;* Norton, *Hay*, Herb.; Carleton, Herb. *Mrs. Heustis.*

309 A. paniculatus, Lam. (A. simplex, Torr. & Gr.) Shores of Kouchibouguasis River, *Fowler;* Norton, *Hay*, Herb.

310 A. tardiflorus, L. Richibucto, *Fowler.* Only a single specimen and therefore somewhat doubtful. A. longifolius partly of former list.

311 A. Novi-Belgii, L. (A. longifolius, Gray, Manual, 233.) Richibucto and Carleton, *Fowler;* St. John, *Hay.* This includes A. æstivus of former list.

312 A. puniceus, L. Very common in swamps and along brooks.
var. lævicaulis, Gray, Syn. Fl. Carleton, *Fowler;* Salmon River, *Wetmore.*

313 A. umbellatus, Mill. (Diplopappus umbellatus, Torr. & Gr.) Common. Kouchibouguac, St. John, *Fowler;* Norton, *Hay*, Herb.

314 A. linariifolius, L. (Diplopappus linariifolius, Hook.) Pabineau Falls, on Nepisiquit River.

315 A. acuminatus, Michx. Common in Kent, St. John, *Fowler*, *Hay*, Herb.; Carleton, Herb. *Mrs. Heustis.*

316 A. nemoralis, Ait. St. John, *Rev.* (now *Dr.*) *J. P. Sheraton*, *Hay*, Herb.; Carleton, Herb. *Mrs. Heustis;* St. Stephen, *Vroom.*

140. ERIGERON, L. - - - - FLEABANE.

317 E. hyssopifolius, Michx. (Aster graminifolius, Pursh.) Mouth of Aroostook, Tattagouche Falls, *Fowler;* Lower Kennebeccasis and Madawaska County, *Hay*, Herb., Bulletin II. 28, 32; Flat Lands, Restigouche, *Chalmers;* common about Andover, *Wetmore.*

318 E. Philadelphicus, L. Woodstock, *Fowler;* St. John River and Norton, *Hay*, Herb.

319 E. annuus, Pers. "Rather common about Hampton and Petitcodiac." *Brittain*, Herb.

320 E. strigosus, Muhl. Norton, *Hay*, Herb.; Carleton, Herb. *Mrs. Heustis;* Bass River, *Fowler.*

321 E. acris, L., var. Drœbachensis, Blytt. Shore at Belledune, Restigouche, *Fowler;* Grand Falls, St. John, and Tobique, *Hay;* New Mills, *Chalmers.*

322 E. Canadensis, L. Very common. Now spreading widely over the globe. Specimens received from Beirout.

141. ANTENNARIA, Gaertn. - - EVERLASTING.

323 A. plantaginifolia, Hook. Common on sterile knolls.

142. ANAPHALIS, DC. - - - EVERLASTING.

324 A. margaritacea, Benth. & Hooker. (Antennaria margaritacea, R. Br.) Abundant throughout.

143. GNAPHALIUM, L. - CUD-WEED. EVERLASTING.

325 G. polycephalum, Michx. Salmon River, *Wetmore.*

326 G. decurrens, Ives. Green Head near St. John, abundant along Salmon River and Grand Lake, *Fowler;* Petitcodiac and Hillsborough, *Brittain.*

327 G. uliginosum, L. Common in damp ground.

328 G. sylvaticum, L. Abundant at Campbellton, in woods at River Charlo, *Fowler;* Petitcodiac and Hopewell, *Brittain;* Campbellton, Herb. Certainly native.

144. INULA, L. - - - - ELECAMPANE.

329 I. HELENIUM, L. Roadside at Norton, and at Newcastle, Grand Lake, *Fowler;* Hampton, *Hay.*

145. AMBROSIA, Tourn. - - - RAGWEED.

330 A. artemisiæfolia, L. Seems to be rare. Coal Branch in Kent Co., *Fowler;* Norton, *Hay*, Herb.

146. XANTHIUM, Tourn. - COCKLEBUR. CLOTBUR.

331 X. strumarium, L. Cape Bald, *Brittain.* Have not seen it.

147. HELIOPSIS, Pers. - - - - OX-EYE.

332 H. scabra, Dunal. Sugar Island, St. John River, *Moser.* Have no specimen.

148. RUDBECKIA, L. - - - CONE-FLOWER.

333 R. hirta, L. Occasionally in grass fields, Restigouche, Kent, York, *Fowler;* Grand Falls, Grand Lake and Norton, *Hay*, Herb.

149. HELIANTHUS, L. - - - SUNFLOWER.

334 H. decapetalus, L. Eel River, Carleton Co., *Hay.*

335 H. ANNUUS, L. Common in gardens.

150. BIDENS, L. - - - - BUR-MARIGOLD.

336 B. frondosa, L. Common about dwellings.

337 B. connata, Muhl. Petitcodiac, *Brittain*, Herb.; Chipman, *Wetmore.*

338 B. cernua, L. Kouchibouguac, Belledune, *Fowler;* Norton, *Hay*, Herb.; Chipman, *Wetmore.*

151. ACHILLEA, L. . - - - YARROW.

339 A. Millefolium, L. Abundant everywhere.

340 A. Ptarmica, L. Looks like a native at River Charlo, Restigouche Co., and Kouchibouguac, Kent Co., *Fowler*, Herb.; Campbellton, *Chalmers*.

152. ANTHEMIS, L. - - - - - CHAMOMILE.

341 A. COTULA, L. (Maruta Cotula, DC.) Very common near dwellings.

342 A. ARVENSIS, L. Ballast, Buctouche.

153. CHRYSANTHEMUM, Tourn. { WHITE-WEED. OX-EYE-DAISY.

343 C. Leucanthemum, L. (Leucanthemum vulgare, Lam.) A very troublesome weed everywhere.

154. TANACETUM, L. - - - - - TANSY.

344 T. VULGARE. L. Often the only memorial of the gardens of the early settlers.

345 T. Huronense, Nutt. Mouth of the Upsalquitch, St. John River, near Fredericton, *Fowler;* along the Upper St. John, but not on its tributaries, *Hay*, Bulletin II. 27.

155. ARTEMISIA, L. - - - - - WORMWOOD.

346 A. caudata, Michx. Goat Island, Grand Lake, *Fowler*, *Hay*, Herb.

347 A. ABSINTHIUM, L. Abundant on roadsides, Buctouche, *Fowler;* St. John, *Hay*, Herb.

348 A. BIENNIS, Willd. Introduced and spreading rapidly. Kouchibouguac, Fairville, *Fowler;* Eel River, Restigouche, Herb.

349 A. VULGARIS, L. Waste grounds near houses in some places.

156. TUSSILAGO, Tourn. - - - - COLTSFOOT.

350 T. FARFARA, L. Spreading rapidly at St. John and Carleton. In St. John it sprang up rapidly and covered sites not built upon after the Great Fire. Bulletin II. 31.

157. PETASITES, Tourn. BUTLER-BUR. SWEET COLTSFOOT.

351 P. palmata, Gray. (Nardosmia palmata, Hook.) Black River, Northumberland Co., along Richibucto River and Kouchibouguac River, *Fowler;* Petitcodiac, *Brittain;* St. John, *Hay*, *Goold*.

158. ARNICA, L. - - - - - - ARNICA.

352 A. Chamissonis, Less. (A. mollis, Hook.) Grand Falls of Nepisiquit, *Fowler;* Tobique Narrows, *Hay*, Bulletin II. 30; Andover and Grand Falls of St. John, *Wetmore*.

159. ERECHTHITES, Rafin. - - FIREWEED.

353 E. hieracifolia, Raf. Very common on recently burnt land.

160. SENECIO, Tourn. - - - GROUNDSEL.

354 S. VULGARIS, L. A weed in gardens and waste grounds.

355 S. aureus, L. What I take for the typical form was sent from Restigouche by *Mr. Chalmers*, and from Florenceville by *Mr. Hay*.

var. Balsamite, Torr. & Gr. Grand Falls of St. John, *Fowler;* rocky shores of Kennebeccasis, *Hay;* a peculiar form of this (var. lanceolatus, Oakes) has been found at Lily Lake, *Fowler*, *Hay*, and at Hartland, Carleton Co., *Hay*.

161. ARCTIUM, L. - - - - - - BURDOCK.

356 A. LAPPA, L. Common near dwellings.

var. tomentosum, Gray. Abundant at Richmond and Morrison's Mill, Fredericton, *Vroom*.

162. CARDUUS, Tourn. - PLUMELESS THISTLE.

357 C. NUTANS, L. Spreading from ballast near Chatham.

163. CNICUS, Tourn. - - PLUMED THISTLE.

358 C. ARVENSIS, Hoffm. (Cirsium arvense, Scop.) Too abundant.

359 C. LANCEOLATUS, Hoffm. (Cirsium lanceolatum, Scop.) Common.

360 C. muticus, Pursh. Kouchibouguac, *Fowler;* St. John Co., Tobique River, *Hay*, Herb.

164. CENTAUREA, L. - - BLESSED THISTLE.

361 C. BENEDICTA, L. (Cnicus benedictus, L.) Escaped from gardens in a few places.

362 C. NIGRA, L. Abundant in some places in Restigouche and at Fredericton.

165. CICHORIUM, Tourn. - - - CICHORY.

363 C. INTYBUS, L. In a few places. Bathurst, *Fowler;* Grand Lake, *Hay*, Herb.

166. HIERACIUM, Tourn. - - HAWKWEED.

364 H. Canadense, Michx. Kouchibouguac, Bass River, *Fowler;* Campbellton, Herb.; Grand Lake, Tobique, *Hay;* King's Co., *Brittain*, Bulletin II. 32; Belledune, *Chalmers*.

365 H. scabrum, Michx. Kouchibouguac, Bass River, *Fowler;* Campbellton, *Hay.*

366 H. UMBELLATUM, L. Belledune, *Chalmers.* Identified by Prof. Macoun.

167. LEONTODON, L. - - - - - HAWKBIT.

367 L. AUTUMNALIS, L. Kouchibouguac, Richibucto River, *Fowler;* Partridge Island, *Hay*, Herb.; St. Hilaire, *Hay*, Bulletin II. 28, 32.

168. TARAXACUM, Haller. - - DANDELION.

368 T. OFFICINALE, Weber, (T. Dens-leonis, Desf.) Abundant everywhere.

169. LACTUCA, Tourn. - - - - - LETTUCE.

369 L. Canadensis, L. Common in Kent Co., *Fowler;* Welsford, *Hay*, Herb.; between Pabineau and Grand Falls, *Dr. Bailey*, Can. Nat. 1864, p. 94.

370 L. integrifolia, Bigel. (L. Canadensis, var. integrifolia, Gray, Manual.) Rare. Norton, *Hay*, Herb.

371 L. leucophæa, Gray. (Mulgedium leucophaeum, DC.) Common in Kent and Northumberland, *Fowler;* Campbellton, *Hay*, Herb.

170. PRENANTHES, Vaill. - RATTLESNAKE-ROOT.

372 P. racemosa, Michx. (Nabalus racemosus, Hook.) Mouth of Kennebeccasis, *Fowler*, *Hay*, Herb.; Campbellton, *Chalmers;* Grand Falls, *Wetmore*, Bulletin II. 32.

373 P. serpentaria, Pursh. Along the Richibucto River, *Fowler;* Quispamsis, *Hay*, Herb. (Nabalus albus of former list.)

374 P. altissima, L. Bass River, Kouchibouguac, *Fowler.*

375 P. Mainensis, Gray. "Shore of St. John River at St. Francis, *Pringle;* very common on the St. John River, *Goodale.*" Has not been reported by N. B. botanists. Gray, Syn. Flor.

171. SONCHUS, Tourn. - - - SOW-THISTLE.

376 S. OLERACEUS. L. Weed in gardens, St. John, St. Andrew's, St. Stephen, *Hay*, *Vroom*, Herb.

377 S. ASPER, Vill. Gardens and rich soil around dwellings.

378 S. ARVENSIS, L. Garden weed.

XXXIX. LOBELIACEÆ.

172. LOBELIA, L.

379 L. Cardinalis, L. St. Andrew's and St. Stephen, *Vroom;* Magaguadavic, St. Croix and tributaries, *Matthew* and *Vroom;* Eel River, Carleton Co., Digdeguash River, *Hay*, Herb.

380 L. Dortmanna, L. Rather rare. Lake Elsie near Richibucto, *Fowler;* foot Douglas Mountain, *Hay;* Clifton Lake, *Wetmore;* Grand Manan, *D. McL. Smith.*

381 L. spicata, Lam. Moncton, *Brittain.* Have not seen it.

382 L. Kalmii, L. Limestone hills, St. John, *Matthew;* shores of St. John and Restigouche Rivers, *Fowler;* St. John and King's Co.'s, *Hay*, Herb.

383 L. inflata, L. Very common throughout the Province.

Lobelia is included in Campanulaceæ by Benth. & Hooker.

XL. CAMPANULACEÆ.

173. CAMPANULA, Tourn. - BELL-FLOWER. HARE-BELL.

384 C. RAPUNCULOIDES, L. St. John, Carleton, *Fowler*, *Hay*, Herb.; a roadside weed at Richmond Corner and St. Stephen, *Vroom.*

385 C. rotundifolia, L. Abundant near St. John, Grand Falls of Nepisiquit, Nigadoo, Blackville, *Fowler;* abundant everywhere in clefts of rocks on St. John and tributaries, *Hay*, Bulletin II. 28, 30; Herb. Have not seen it in Kent.

386 C. aparinoides, Pursh. St. George and St. Stephen, *Vroom*, Herb.; Grand Lake, Gondola Point, Westfield, King's Co., *Hay;* St. George, Chipman, Andover, *Wetmore.*

XLI. VACCINIACEÆ.

174. GAYLUSSACIA, H. B. K. - HUCKLEBERRY.

387 G. dumosa, Torr. & Gr. In a peat bog near Richibucto, *Fowler;* St. Stephen, *Vroom*, Herb.

388 G. resinosa, Torr. & Gr. Rather common in Kent and Northumberland Co.'s, Grand Lake, *Fowler.*

175. VACCINIUM, L. - BLUEBERRY. BILBERRY.

389 V. Pennsylvanicum, Lam. Abundant in barrens and swamps. var. nigrum, Wood., has black berries without a bloom.

390 V. Canadense, Kalm. Less abundant than the preceding, in burned barrens and swamps.

391 V. corymbosum, L. Apparently rare. Grand Lake, *Hay;* St. Stephen, *Vroom.*
var. atroceum, Gray. A single specimen found at Weldford on the Richibucto River seems to belong to this form.

392 V. caespitosum, Michx. St. Francis River and Upper St. John, *Hay*, Bulletin II. 25, 27.

176. OXYCOCCUS, Pers. - - - CRANBERRY.

393 O. palustris, Pers. Common in peat bogs everywhere and on marshes round the coast.

394 O. macrocarpus, Pursh. Peat bogs and marshes. Abundant.

177. CHIOGENES, Salisb. - - - SNOWBERRY.

395 C. hispidula, Torr. & Gr. Abundant in mossy damp woods.

XLII. ERICACEÆ.

178. ARCTOSTAPHYLUS, Adans. - BEARBERRY.

396 A. Uva-ursi, Spreng. Kennebeccasis Island, *Hay*, Herb.

179. GAULTHERIA, Kalm, L. - AROMATIC WINTERGREEN.

397 G. procumbens, L. Common in Northumberland and Kent, *Fowler*, and in St. John and King's, *Hay*, Herb. "I never found it north of Bathurst," *Chalmers.*

180. CASSANDRA, Don. - - LEATHER-LEAF.

398 C. calyculata, Don. Abundant in bogs throughout the Province, *Fowler;* St. John, *Hay*, Herb.; Bald Mountain on the Tobique, *Dr. Bailey*, Can. Nat. 1864, p. 87.

181. EPIGÆA, L. - - - - MAYFLOWER.

399 E. repens, L. Abundant in Kent and Northumberland, *Fowler;* St. John and King's, *Hay*, Herb. "I never found it north of Bathurst," *Chalmers.*

182. ANDROMEDA, L. - - - ANDROMEDA.

400 A. polifolia, L. Common in cold bogs. Kent Co., *Fowler;* St. John, *Hay*, Herb.

183. KALMIA, L. - - - AMERICAN LAUREL.

401 K. angustifolia, L. Abundant in dry barrens.

402 K. glauca, Ait. Common. Kouchibouguac, along Richibucto River, *Fowler;* St. John, Jemseg, *Hay*, Herb.

184. LEDUM, L. - - - - LABRADOR TEA.

403 L. latifolium, Ait. Common in wet barrens. Kouchibouguac, Bass River, *Fowler;* St. John Co., *Hay*, Herb.; Herb. *Mrs. Heustis;* Bald Mountain on the Tobique, *Dr. Bailey*, Can. Nat. 1864, p. 87, Nictau Lake, l. c. p. 88.

185. RHODODENDRON, L. - - ROSE-BAY.

404 R. Rhodora, Don. Covering extensive tracts of swampy ground in the northern counties, *Fowler;* St. John and King's, *Hay*, Herb.

186. PYROLA, Tourn. - WINTERGREEN. SHINLEAF.

405 P. minor, L. Hopewell, *Brittain.* Said to be found at Dalhousie.

406 P. secunda, L. Common in rich woods.

407 P. chlorantha, Swartz. Lily Lake, *Hay*, Herb.; between Woodstock and Houlton, *Vroom.* "A specimen of this plant presented to the Herbarium by I. Allan Jack, Esq., is dated Fredericton, 1844; Petitcodiac, *Brittain;* Richmond, *Vroom.*" Bulletin III. 34.

408 P. elliptica, Nutt. Very common. Norton, *Hay*, Herb.; Indian Falls of Nepisiquit, *Dr. Bailey*, Can. Nat. 1864, p. 92.

409 P. rotundifolia, L. Common. Bass River, *Fowler.*

var. incarnata, DC. Fredericton, *Dr. Bailey;* Edmundton, *Hay.*

var. asarifolia, Hook. Woodstock, *Fowler.*

var. uliginosa, Gray. Andover, *Hay*, Bulletin II. 30.

187. MONESES, Salisb. - ONE-FLOWERED PYROLA.

410 M. uniflora, Gray. Rather common. Kent and Northumberland Co., *Fowler;* St. John Co., *Hay*, Herb.; Salmon River, *Wetmore.*

188. CHIMAPHILA, Pursh. - - PIPSISSEWA.

411 C. umbellata, Nutt. Common. Bass River, Kouchibouguac, *Fowler;* Grand Lake, *Hay*, Herb.

XLIII. MONOTROPEÆ.

189. MONOTROPA, L. - INDIAN PIPE. PINE-SAP.

412 M. uniflora, L. Restigouche and Kent Co.'s, *Fowler;* St. John and King's, *Hay*, Herb.

190. HYPOPITYS, Scop. - - - PINE-SAP.

413 H. lanuginosa, Nutt. Growing in shade of pine trees at St. Andrew's, *Vroom;* Petitcodiac, *Brittain*, Herb.; Andover, *Wetmore;* Lily Lake, *Hay;* Sheldon's Point, Lancaster, *Mrs. H. W. Frith.* (Monotropa Hypopitys of former editions.)

XLIV. PLUMBAGINACEÆ.

191. STATICE, Tourn. - - - SEA-LAVENDER.

414 S. Limonium, L., var. Caroliniana, Gray. Common in salt marshes round the coast. Kouchibouguac, *Fowler;* Sackville and St. John, *Hay*, Herb.

XLV. PRIMULACEÆ.

192. PRIMULA, L. - - - - PRIMROSE.

415 P. farinosa, L. Restigouche, *Chalmers.*

416 P. Mistassinica, Michx. The form found on Lower Kennebeccasis Dr. Gray pronounces "P. Mistassinica passing into P. farinosa." Flat Lands, Restigouche, *Chalmers.*

193. STEIRONEMA, Raf.

417 S. ciliatum, Raf. (Lysimachia ciliata, L.) Salmon River in Kent Co., Fredericton, *Fowler;* St. John and King's, *Hay.*

194. LYSIMACHIA, L. - - - LOOSESTRIFE.

418 L. quadrifolia, L. "Sandy or gravelly soil, New Brunswick," Gray, Syn. Flor. Our botanists have not reported it.

419 L. stricta, Ait. Common in Kent Co., *Fowler;* St. John and King's, *Hay*, Herb.; Lancaster, Herb. *Mrs. Heustis.*

420 L. thyrsiflora, L. Rather rare. Shediac, *Fowler*; Hopewell Cape and Norton, *Hay*, Herb.

195. TRIENTALIS, L. - CHICKWEED-WINTERGREEN.

421 T. Americana, Pursh. Common throughout the Province.

196. GLAUX, L. - - - - SEA-MILKWORT.

422 G. maritima, L. Common round the coast everywhere.

197. ANAGALLIS, L. - - - - PIMPERNEL.

423. A. ARVENSIS, L. Rare. St. Andrew's, *Vroom*; St. John, *Hay*, Herb.

198. SAMOLUS, Tourn. - - WATER-PIMPERNEL.

424 S. Valerandi, L., var. Americanus, Gray. Muddy shore of a small brook at Kouchibouguac, only place I have noticed it.

XLVI. OLEACEÆ.

199. FRAXINUS, Tourn. - - - - - ASH.

425 F. Americana, L. Common. Kent Co., *Fowler*; abundant on Tobique, *Hay*.

426 F. sambucifolia, Lam. Common. Abundant on Tobique, *Hay*.

427 F. pubescens, Lam. Bellisle, *Brittain*. On Darling's Island.

XLVII. APOCYNACEÆ.

200 APOCYNUM, Tourn. - DOGBANE. INDIAN HEMP.

428 A. androsæmifolium, L. Common in Kent Co., *Fowler;* St. John and King's, *Hay*, Herb.; Nepisiquit River, *Fowler*, *Dr. Bailey*, Can. Nat. 1864, p. 94.

429 A. cannabinum, L. Restigouche, Pabineau Falls, Grand Lake, Keswick Islands, *Fowler;* St. John and King's, *Hay*, Herb.; abundant on Upper St. John, *Wetmore*, *Hay*.

XLVIII. ASCLEPIADACEÆ.

201. ASCLEPIAS, L. - - - - MILKWEED.

439 A. incarnata, L. Keswick Valley, *Dr. Bailey*, *Hay*, *Fowler*, Welsford, Upper St. John and tributaries, Eel River, *Hay;* Charlotte and Carleton Co.'s, St. James and Richmond, *Vroom;* Pokiok and Tobique River, *Wetmore*.

431 A. Cornuti, Decaisne. In old fields, Fredericton, *Fowler;* Westfield and Upper St. John, *Hay*.

XLIX. GENTIANACEÆ.

202 GENTIANA, L. - - - - GENTIAN.

432 G. Amarella, L., var. acuta, Hook. f. At the mouth of the Restigouche, *Chalmers*, Herb.; Keswick Ridge, *G. H. Burnett;* Falls at the mouth of the St. John, *Hay*.

433 G. linearis, Fresl. Near Weldford Station, Kent Co., *Fowler;* Nashwaaksis, *Moser*, Herb.; near Green River, *Dr. Bailey* and *Mr. Reed*.

203. HALENIA, Borkh. - - SPURRED GENTIAN.

434 H. deflexa, Griseb. Abundant along the Restigouche River and at the mouth of the Upsalquitch, Carleton, St. John Co., *Fowler;* rather abundant on St John and its tributaries, Andover, *Hay*, Bulletin II. 30.

204. MENYANTHES, Tourn. - - BUCKBEAN.

435 M. trifoliata, L. Common in bogs, Kent, *Fowler;* St. John and King's, *Hay*, Herb.

205. LIMNANTHEMUM, Gmelin. - FLOATING-HEART.

436 L. lacunosum, Griseb. St. Stephen, *Vroom;* abundant in a lake near residence of G. G. King, Esq., Salmon River, Queen's Co., *Hay*, Herb.; King's Co., *Brittain;* Clifton Lake, *Wetmore;* Musquash, St. John Co., *D. McL. Smith.*

L. POLEMONEACEÆ.

206. COLLOMIA, Nutt.

437 C. linearis, Nutt. This plant is a native of the region from Winnipeg and Mackenzie River west to the Pacific. It is therefore strange to find it growing at Eel River, Restigouche Co., on sands often covered by the tides and on the high rocky hill towards Dalhousie. If it is not native, it is at least thoroughly naturalized.

LI. BORRAGINACEÆ.

207. CYNOGLOSSUM, Tourn. - HOUND'S-TONGUE.

438 C. Virginicum, L. Petitcodiac, *Brittain*, Herb.

208. ECHINOSPERMUM, Swartz. - STICKSEED.

439 E. Virginicum, Lehm. Sand beach at Eel River, Restigouche, *Fowler*, *Chalmers;* Carleton, *Hay*, Herb. (E. Lappula of former list.)

209. SYMPHYTUM, Tourn. - - - COMFREY.

440 S. OFFICINALE, L. Apparently naturalized in St. John Cemetery.

210. LYCOPSIS, L. - - - - - - BUGLOSS.

441 L. ARVENSIS, L. Sand beach, Eel River, Restigouche, Herb.

211. MERTENSIA, Roth. - - SEA-LUNGWORT.

442 M. maritima, Don. Sand beaches, Restigouche, St. John.

212. MYOSOTIS, L. - - - FORGET-ME-NOT.

443 M. laxa, Lehm. In wet ditches at Point LeNim, Restigouche, *Fowler;* rather abundant in southern sections of the Province, Howe's Lake, *Hay*, Herb.; Carleton, Herb. *Mrs. Heustis.*

444 M. ARVENSIS, Hoffm. Spreading from a garden at Bass River, Kent Co., 1876, *Fowler;* St. Andrew's, *Vroom.*

213. LITHOSPERMUM, L. - - GROMWELL.

445 L. OFFICINALE, L. Roadside near Campbellton, Restigouche Co., *Fowler*, *Hay*, Herb.

214. ECHIUM, L. - VIPER'S BUGLOSS. BLUEWEED.

446 E. VULGARE, L. Fredericton, *Fowler;* Petitcodiac and Quaco, *Brittain*, Herb.

LII. CONVOLVULACEÆ.

215. CONVOLVULUS, L. - - - BINDWEED.

447 C. sepium, L., var. Americanus, Sims. Rather common near the coast. Kouchibouguac, *Fowler;* Norton, *Hay*, Herb.

C. ARVENSIS, L. Cultivated fields, Richibucto. Rare.

216. CUSCUTA, Tourn. - - - - DODDER.

448 C. Gronovii, Willd. Twining around grasses and other herbaceous plants, mouth of Kennebeccasis, *Fowler;* Partridge Island, Lower St. John, Grand Lake, *Hay;* Cape Bald, *Brittain;* Nashwaaksis and St. Stephen, also at Lake Utopia, Bulletin III. 32.

LIII. SOLANACEÆ.

217. SOLANUM, Tourn. - - - NIGHTSHADE.

449 S. NIGRUM, L. Occasionally near dwellings. Kouchibouguac, Carleton, *Fowler*, *Hay*, Herb.

450 S. DULCAMARA, L. Near dwellings, Fredericton.

218. DATURA, L. - STRAMONIUM. THORN-APPLE.

451 D. STRAMONIUM, L. Rarely escaped from gardens in Kent, *Fowler;* weed well established at St. Andrew's and St. Stephen, *Vroom.*

452 D. TATULA, L. Garden weed. Richibucto, Carleton, ballast heaps, St. John.

219. HYOSCYAMUS, Tourn. - - HENBANE.

453 H. NIGER, L. Scarce. Miramichi, Richibucto, Bass River, *Fowler;* Dalhousie, St. John, *Hay*, Herb., Bulletin II. 31.

LIV. SCROPHULARIACEÆ.

220. VERBASCUM, L. - - - - - MULLEIN.

454 V. THAPSUS, L. Rather rare. Newcastle, Northumberland Co., Kouchibouguasis, Kent Co., *Fowler;* Dalhousie, Herb.; King's County, *Hay.*

455 V. BLATTARIA, L. St. Andrew's, Richmond, *Vroom.*

221. LINARIA, Tourn. - - - - TOAD-FLAX.

456 L. Canadensis, Dumont. St. Stephen, *Vroom*, Herb.

457 L. VULGARIS, Mill. Escaped from gardens in a few places. Kouchibouguac, Bass River, *Fowler;* Woodstock, *Hay*, Herb.

222. CHELONE, Tourn. - SNAKE-HEAD. TURTLE-HEAD.

458 C. glabra, L. Common in Kent Co., *Fowler;* Norton, *Hay.* Herb.

223. MIMULUS, L. - - - MONKEY-FLOWER.

459 M. ringens, L. Common in wet places.

224. ILYSANTHES, Raf. - - FALSE PIMPERNEL.

460 I. gratioloides, Benth. In wet sandy or gravelly places subject to inundation. Bass River, *Fowler;* York County, *Moser.*

225. LIMOSELLA, L. - - - - MUDWORT.

461 L. aquatica, L., var. tenuifolia, Hoffm. Very rare. Near St. Stephen, *Vroom.*

226. VERONICA, L. - - - - - SPEEDWELL.

462 V. VIRGINICA, L. Have only seen it in gardens.

463 V. Americana, Schw. Common in brooks and ditches. Kent Co., *Fowler;* Norton, *Hay*, Herb.; Andover and Chipman, *Wetmore.*

464 V. scutellata, L. Common. Along Richibucto River, Woodstock, *Fowler;* Norton, *Hay*, Herb.

465 V. officinalis, L. Dry fields or hills, Norton, and near Fredericton, *Fowler;* Campbellton, *Chalmers.*

466 V. serpyllifolia, L. Very common. Bass River, *Fowler;* Norton, *Hay*, Herb.; Carleton, Herb. *Mrs. Heustis.*

467 V. peregrina, L. Have only seen it at Kouchibouguasis in damp waste ground.

468 V. ARVENSIS, L. Chamcook Mt., *Hay*, Herb.; St. Andrew's, *Vroom;* Portage, King's Co., and Hillsborough, *Brittain.*

469 V. AGRESTIS, L. Escaped from a garden at Richibucto, and spreading; *Fowler;* Fredericton, University Herb.; Carleton, *Hay*, Herb.; St. Andrew's, *Vroom.*

227. CASTILLEIA, Mutis. - - PAINTED CUP.

470 C. pallida, Kunth., var. septentrionalis, Gray. Hills of Restigouche, *Fowler;* common on Upper St. John, Tobique, *Hay*, Herb., Bulletin II. 28.

228. EUPHRASIA, Tourn. - - - EYEBRIGHT.

471 E. officinalis, L. Very abundant on dry hills near Bathurst and St. John, *Fowler;* McAdam Brook, Charlotte Co., Carleton, *Hay*, Herb.

var. Tartarica, Benth. (E. latifolia, Pursh.) Cape Bald and abundant on a marsh at Cape Enrage, *Brittain.*

229. BARTSIA, L.

472 B. ODONTITES, Hudson. Westmoreland Co., *Trueman;* Lancaster beach, and abundant on an island at the Falls, mouth of St. John, *Hay*, Herb.

230. PEDICULARIS, Tourn. - - LOUSEWORT.

473 P. Canadensis, L. Grand Falls of the St. John, *Moser.*

474 P. Furbishiæ, Watson. Rather common on both sides St. John River between Grand Falls and Andover, *Hay* and *Wetmore;* abundant at mouth of Aroostook, *Vroom.*

231. RHINANTHUS, L. - - YELLOW-RATTLE.

475 R. Crista-galli, L. Common near St. John, North of Miramichi on Bathurst road; Blacklands, Restigouche Co., *Fowler;* St. John and King's, Herb.

232. MELAMPYRUM, Tourn. - - COW-WHEAT.

476 M. Americanum, Michx. Common in Kent Co., *Fowler;* St. John, *Hay*, Herb.

LV. OROBANCHACEÆ.

233. APHYLLON, Mitchell. - - CANCER-ROOT.

471 A. uniflorum, Gray. Nashwaaksis, *Fowler;* Petitcodiac, *Brittain.*

234. EPIPHEGUS, Nutt.

478 E. Virginiana, Bart. Rather rare. Bass River, Kent Co., and Norton, *Fowler.*

LVI. LENTIBULARIACEÆ.

235. UTRICULARIA, L. - - BLADDERWORT.

479 U. clandestina, Nutt. Shallow water of a small lake near Richibucto, *Fowler;* Cape Enrage, *Brittain.*

480 U. vulgaris, L. Common in stagnant waters and slow streams and lakes. Richibucto River, also Rothesay, *Fowler*, Herb.; McAdam Junction, *Hay.*

481 U. intermedia, Hayne. St. Patrick, Charlotte Co., *Vroom*, Herb.; Otty's Lake near Hampton, *Brittain*, Herb.

482 U. cornuta, Michx. Common in peat bogs. St. John, *Matthew*, *Sheraton*, *Hay*, Herb.; near Richibucto, *Fowler.*

LVII. VERBENACEÆ.

236. PHRYMA, L. - - - - - - LOPSEED.

483 P. Leptostachya, L. Woodstock and Keswick Ridge, *Fowler;* Upper St. John, *Hay*, Herb., Bulletin II. 30; Lower Norton, *Brittain;* Andover, *Wetmore.*

237. VERBENA, Tourn. - - - - - VERVAIN.

484 V. urticæfolia, L. Keswick Ridge, *Moser*, *Hay*, Herb.; Eel River, York Co., *Hay*, Bulletin II. 30.

485 V. hastata, L. Waste grounds. Kouchibouguac, *Fowler;* Norton and Tobique, *Hay*, Herb., Bulletin II. 30; Andover and St. George, *Wetmore.*

LVIII. LABIATÆ.

238. MENTHA, Tourn. - - - - - - MINT.

486 M. VIRIDIS, L. Baltimore, Albert Co., *Brittain.*

487 M. PIPERITA, L. Sparingly escaped from gardens.

488 M. ARVENSIS, L. Field at Norton.

489 M. SATIVA, L. Escaped from gardens.

490 M. Canadensis, L. Common in Kent Co., *Fowler;* St. John and King's, *Hay*, Herb.

var. glabrata, Benth. Rather rare. St. John and Restigouche, *Fowler;* Campbellton, *Hay*, Herb.; *Chalmers.*

239. LYCOPUS, Tourn. WATER HOREHOUND. BUGLE-WEED.

491 L. Virginicus, L. Common in Kent Co., *Fowler;* King's, *Hay*, Herb.

492 L. sinuatus, Ell. Common in wet grounds, Kent Co., *Fowler;* King's, *Hay*, Herb.

240. HEDEOMA, Pers. - - - - PENNYROYAL.

493 H. pulegioides, Pers. In a waste field at Green Head, St. John, *Fowler*, *Hay*, Herb.

241. CALAMINTHA, Tourn. - - - CALAMINT.

494 C. Clinopodium, Benth. Open woods on hillsides, Restigouche, *Fowler;* Keswick Ridge, *Burnett;* Eel River, *Hay*, Herb.; Andover and Tobique River, *Wetmore;* Bellisle, King's Co., *Brittain.*

242. NEPETA, L. - - - - - - CAT-MINT.

495 N. CATARIA, L. Rarely escaped from gardens, Grand Lake, *Hay*, Herb.

496 N. Glechoma, Benth. About dwellings. Abundant on roadsides between Shediac and Shemogue, *Fowler;* Clifton, *Hay*, Herb.

243. SCUTELLARIA, L. - - - - SKULLCAP.

497 S. lateriflora, L. Common everywhere. Herb.

498 S. galericulata, L. Common everywhere. Herb.

244. BRUNELLA, Tourn. - SELF-HEAL. HEAL-ALL.

499 B. vulgaris, L. Common everywhere. Herb.

245. STACHYS, Tourn. - - - - WOUNDWORT.

500 S. palustris, L. Napan Bridge, Northumberland Co., *Fowler;* St. Stephen and Chamcook, *Vroom*, Herb.; Quaco, *Brittain;* Partridge Island, *Hay;* introduced in ballast at Buctouche, *Fowler.*

246. GALEOPSIS, L. - - - - HEMP-NETTLE.

501 G. TETRAHIT, L. A very common weed in rich damp soil. Herb.

247. LEONURUS, L. - - - - MOTHERWORT.

502 L. CARDIACA, L. Common in waste places near dwellings.

248. LAMIUM, Tourn. - - - DEAD-NETTLE.

503 L. AMPLEXICAULE, L. St. Andrew's, *Vroom.*

249. TEUCRIUM, L. - - - - - GERMANDER.

504 T. Canadense, L. Sand beach, Kouchibouguac.

LIX. PLANTAGINACEÆ.

250. PLANTAGO, Tourn. - PLANTAIN. RIBWORT.

505 P. MAJOR, L. Everywhere near dwellings.

506 P. decipiens, Barneoud. Miramichi and St. John. (P. maritima of former list.)

507 P. LANCEOLATA, L. St. John, *Hay*, Herb.; *Fowler.*

DIVISION C.—APETALÆ.

LX. AMARANTACEÆ.

251. AMARANTUS, Tourn. - - AMARANTH.

508 A. RETROFLEXUS, L. Along the shore at Fredericton, *Fowler;* Salmon River, *Wetmore.*

LXI. CHENOPODIACEÆ.

252. CHENOPODIUM, L. - PIGWEED. GOOSEFOOT.

509 C. ALBUM, L. A very common weed.

510 C. URBICUM, L. At the railway depot, Carleton, *Fowler*, *Hay;* Petitcodiac, *Brittain.*

511 C. HYBRIDUM, L. Petitcodiac, *Brittain.*

512 C. BOTRYS, L. On the shore at Government House. Probably an outcast from the garden.

513 C. capitatum, Benth. & Hook. (Blitum capitatum, L.) Indigenous, or at least fully naturalized about Andover and mouth of Aroostook, *Wetmore;* Eel River, Restigouche Co., Herb.; Tobique River and Grand Lake, apparently indigenous, *Hay*, Bulletin II. 29.

253. ATRIPLEX, Tourn. - - - - ORACHE.

514 A. patula, L. Several forms of this very variable plant occur along the sea coast. *Fowler.*
var. hastata, Gray. Carleton, *Hay*, Herb.
var. littoralis, Gray. St. John, *Hay*.

254. SALICORNIA, Tourn. - GLASSWORT. SAMPHIRE.

515 S. herbacea, L. Common in salt marshes round the coast.

255. SUAEDA, Forskel. - - - SEE-BLITE.

516 S. maritima, Domortier. Salt marshes on the coast.

256. SALSOLA, L. - - - - - SALTWORT.

517 S. Kali, L. Common on sand beaches along the Gulf shore, *Fowler;* St. Andrew's, *Vroom*, Herb.

LXII. POLYGONACEÆ.

257. POLYGONUM, L. - - - - KNOTWEED.

518 P. Pennsylvanicum, L. Shediac, *Moser;* Salmon River, *Wetmore.*

519 P. incarnatum, Ell. Moncton and Keswick, *Moser;* Salmon River, *Wetmore.*

520 P. PERSICARIA, L. Common about dwellings and barns.

521 P. Hydropiper, L. Common in wet grounds and ditches, Kouchibouguac, *Fowler;* Norton, *Hay*. Herb.; Chipman, *Wetmore.*

522 P. acre, H. B. K. Fredericton, *Moser;* Bass River, *Fowler.*

523 P. hydropiperoides, Michx. Keswick, *Moser;* Bloomfield, King's Co., *Brittain*, Herb.

524 P. amphibium, L., var. aquaticum, Willd. In water, Hammond River, *Fowler.*

525 P. Hartwrightii, Gray. (P. amphibium, var. terrestre of former list.) Wet soil, or in water, Oxbow, Salmon River, and in Kent Co., *Fowler;* Tobique, *Hay.*

526 P. aviculare, L. Abundant in yards. The European plant with 8 stamens occurs at the railway depot, Carleton. Mr. Brittain sends specimens of a plant from salt marshes at Moncton, Hillsborough, etc., which grows erect, nearly or quite 2 feet high, and which seems to be a tall form of this or an allied species.

527 P. maritimum, L. Sandy sea shore of Northumberland and Kent.

528 P. arifolium, L. Low grounds, Kouchibouguac, *Fowler;* Hopewell, *Brittain.*

529 P. sagittatum, L. Kouchibouguac, Fredericton, *Fowler;* Jemseg and King's Co., *Hay*, Herb.

530 P. CONVOLVULUS, L. Kouchibouguac and Bass River, *Fowler;* Eel River, Restigouche, Herb.

531 P. cilinode, Michx. Climbing over shrubs and fallen trees, Kouchibouguac, *Fowler;* Norton, *Hay*, Herb.

532 P. dumetorum, L., var. scandens, Gray. Norton, *Fowler;* along St. John River, *Hay.*

533 P. TARTARICUM, L. Extensively cultivated and spontaneous for a few years.

258. FAGOPYRUM, Tourn. - - BUCKWHEAT.

534 F. ESCULENTUM, Moench. Cultivated and remaining as a weed for a few years.

259. RUMEX, L. - - - - DOCK. SORREL.

535 R. PRATENSIS, Mert. Campbellton, *Chalmers;* also Herb.

536 R. orbiculatus, Gray. In wet places, Kent, *Fowler;* Campbellton, *Chalmers.*

537 R. salicifolius, Weinmann. Shore of Richibucto River, *Fowler;* Campbellton, Herb.; Campbellton and New Mills, *Chalmers.*

538 R. CRISPUS, L. Fredericton. In grass fields.

539 R. OBTUSIFOLIUS, L. Tabusintac on Bathurst road, *Fowler;* Germain Brook, King's Co., *Brittain.*

540 R. maritimus, L. Shore near mouth of Molus River, and Shediac.

541 R. ACETOSELLA, L. The most abundant weed in old and barren fields.

542 R. occidentalis, Watson. Campbellton, *Chalmers. Fide* Prof. Macoun.

LXIII. ARISTOLOCHIACEÆ.

260. ASARUM, Tourn. - - - WILD-GINGER.

543 A. Canadense, L. Fredericton, *Fowler;* Queensbury, *Dr. Bailey;* Morrison's Mills, *Vroom*, Herb.; common about Andover in rich woods, *Wetmore;* abundant on Upper St. John and St. Francis, Salmon (Victoria Co.) and Eel Rivers, *Hay*, Bulletin II. 25; Darling's Island, *Brittain.*

LXIV. THYMELEACEÆ.

261. DIRCA, L. - LEATHERWOOD. MOOSEWOOD.

544 D. palustris, L. Keswick Ridge, *G. H. Burnett;* Hillsborough, *Brittain.*

LXV. ELEAGNACEÆ.

262. SHEPHERDIA, Nutt. - - SHEPHERDIA.

545 S. Canadensis, Nutt. Clinging to rocky banks at Grand Falls, St. John, and at Cape Bon Ami, Restigouche, *Fowler;* Narrows, Tobique River, *Hay*, Bulletin II. 30.

LXVI. SANTALACEÆ.

263. COMANDRA, Nutt. - BASTARD TOAD-FLAX.

546 C. livida, Richardson. Near St. John, *Matthew*, *Brittain;* Port Elgin, *Brittain.*

LXVII. EUPHORBIACEÆ.

264. EUPHORBIA, L. - - - - - SPURGE.

547 E. polygonifolia, L. Kouchibouguac beach in sand.

548 E. HELIOSCOPIA, L. River Charlo and Buctouche, *Fowler*, Herb.

549 E. CYPARISSIAS, L. Have only noticed it in gardens, *Fowler;* about roadsides in a few places, Nashwaak, *Vroom.*

550 E. PEPLUS, L. Spontaneous in gardens, Richibucto, *Fowler;* weed in gardens, Chipman, *Wetmore.*

LXVIII. URTICACEÆ.

265. ULMUS, L. - - - - - - - ELM.

551 U. Americana, L. Common on rich intervales.

266. HUMULUS, L. - - - - - - HOP.

552 H. LUPULUS, L. Cultivated. Scarcely wild.

267. CANNABIS, Tourn. - - - - - HEMP.

553 C. sativa, L. Spontaneous in a few places. Richibucto, *Fowler;* near Taborville Bridge, King's Co., *Brittain*, Herb.

268. URTICA, Tourn. - - - - - NETTLE.

554 U. gracilis, Ait. Rather common in waste places. Bass River, *Fowler*, Herb.; Salmon River (Victoria Co.), *Hay.*

555 U. DIOICA, L. Ballast, St. John, *Hay*, Herb.

556 U. URENS, L. Bass River, *Fowler;* St. John, *Hay*, Herb.; St. Andrew's, *Vroom.*

269. LAPORTEA, Gaudichaud. - WOOD-NETTLE.

557 L. Canadensis, Gaudichaud. Rich intervales, Kouchibouguac, Bass River, *Fowler;* Norton, *Hay*, Herb.

270. PILEA, Lind. - RICHWEED. CLEARWEED.

558 P. pumila, Gray. Odell's Grove at Fredericton, Norton, *Fowler*, *Hay;* Petitcodiac and Havelock, *Brittain;* a troublesome weed on grounds of C. E. Grosvenor at Canterbury, *Hay.*

LXIX. JUGLANDACEÆ.

271. JUGLANS, L. - - - - - - WALNUT.

559 J. cinerea, L. Rich woods along the St. John and its tributaries. Have not seen it in northern counties, *Fowler;* forming beautiful groves at Eel River, Woodstock and elsewhere on Upper St. John, Norton, *Hay*, Herb.

LXX. MYRICACEÆ.

272. MYRICA, L. - BAYBERRY. WAX-MYRTLE.

560 M. Gale, L. Wet places in barrens and along low shores of ponds and streams. Common.

561 M. cerifera, L. Sand beach on the sea shore, Kent and Northumberland, *Fowler;* Petitcodiac, *Brittain.*

562 M. asplenifolia, Endl. (Comptonia asplenifolia, Ait.) Abundant in dry gravelly ground, Kent, *Fowler;* Norton, McAdam Junction, *Hay*, Herb.

LXXI. CUPULIFERÆ.

273. BETULA, L. - - - - - - BIRCH.

563 B. lenta, L. Common forest tree.

564 B. lutea, Michx. f. Common forest tree in rich soil.

565 B. alba, L., var. populifolia, Spach. Common.

566 B. papyracea, Ait. Common in rich soil everywhere.

567 B. pumila, L. Swamps and bogs, Richibucto.

274. ALNUS, Gaertn. - - - - - - ALDER.

568 A. incana, Willd. Along streams everywhere.

569 A. viridis, DC. Common in damp soil. Richibucto, *Fowler;* Carleton, *Hay*, Herb.

275. OSTRYA, Scop. - HOP-HORNBEAM. LEVER-WOOD.

570 O. Virginica, Willd. Rather rare. Bass River, Fredericton.

276. CORYLUS, L. - - - - HAZELNUT.

571 C. rostrata, Ait. Common along banks of streams.

277. QUERCUS, L. - - - - - OAK.

572 Q. rubra, L. Rather common. Kent, Northumberland, York.

573 Q. macrocarpa, Michx. (Q. alba of former list.) Near residence of W. S. Butler, Esq., Grand Lake. Rare.

574 Q. coccinea, Wang., var. ambigua, Gray. Is said by Mr. Brittain to be quite common at Bellisle, King's Co. I have not seen it.

278. FAGUS, L. - - - - - - BEECH.

575 F. ferruginea, Ait. Common forest tree.

LXII. SALICACEÆ.

279. SALIX, L. - - - - - . WILLOW.

576 S. humilis, Marshall. Dry barrens. Bass River, Kouchibouguac.

577 S. discolor, Muhl. Banks of streams and wet grounds. Common.

578 S. petiolarsis, Smith. Petitcodiac, *Brittain;* St. Stephen, *Vroom.*

579 S. cordata, Muhl. Bass River, *Fowler;* Petitcodiac, *Brittain;* Salmon River, *Wetmore.*

580 S. livida, Wahl., var. occidentalis, Gray. Very common.

581 S. VIMINALIS, L. Cultivated in a few places.

582 S. lucida, Muhl. Rather common. Kouchibouguac.

583 S. nigra, Marsh. Have only seen it at Harris Cove.

584 S. FRAGILIS, L. Commonly planted.

585 S. BABYLONICA, Tourn. Cultivated for ornament.

586 S. myrtilloides, L. In bogs, Richibucto.

587 S. pyrifolia, Anderss. Abundant in Gloucester, Northumberland, Kent Co.'s, also at Carleton, St. John Co. (Not in Gray's Manual.)

280. POPULUS, L. - - - POPLAR. ASPEN.

588 P. tremuloides, Michx. Common forest tree.

589 P. grandidentata, Michx. Rather common.

590 P. balsamifera, L. Not common. Kouchibouguac, Bass River.
var. candicans, Gray. Planted for ornament.

LXXIII. EMPETRACEÆ.

281. EMPETRUM, L. - - - - - CROWBERRY.

591 E. nigrum, L. Hillocks in bogs, common. Hanging over rocky banks some places along Bay Chaleur.

SUB-CLASS II. — GYMNOSPERMÆ.

LXXIV. CONIFERÆ.

282. THUJA, L. - - - - - - - CEDAR.

592 T. occidentalis, L. Common throughout the Province.

283. JUNIPERUS, L. - - - - - JUNIPER.

593 J. communis, L. Dry pastures and barren hills. St. John, *Fowler;* King's, Charlotte, *Hay.*

594 J. Sabina, L., var. procumbens, Pursh. Sand beach, Eel River, Restigouche Co., *Fowler;* N. Head of Grand Manan, *Hay*, Herb.

284. TAXUS, Tourn. - - GROUND-HEMLOCK.

595 T. baccata, L., var. Canadensis, Gray. Common in Kent, *Fowler;* St. John, *Hay.*

285. PINUS, Tourn. - - - - - - PINE.

596 P. Banksiana, Lambert. Abundant on dry burnt barrens in Kent and Northumberland, *Fowler;* "forms thick groves extending for miles about Petitcodiac and Anagance," *Vroom*, Bulletin II. 36.

597 P. resinosa, Ait. Abundant in many places in old forests.

598 P. Strobus, L. Our most valuable forest tree.

286. PICEA, Link. - - - - - - SPRUCE.

599 P. alba, Link. (Abies alba, Michx.) Common throughout.

600 P. nigra, Link. (Abies nigra, Poir.) Common throughout.

287. TSUGA, Carr. - - - - - HEMLOCK.

601 T. Canadensis, Endl. (Abies Canadensis, Michx.) In Kent, Northumberland, Gloucester and King's, forming large forests.

288. ABIES, Tourn. - - - - - - - FIR.

602 A. balsamea, Marshall. Common everywhere.

289. LARIX, Tourn. - - LARCH. HACMATAC.

603 L. Americana, Michx. Common throughout.

CLASS II.—ENDOGENOUS PLANTS.

LXXV. HYDROCHARIDACEÆ.

290. VALISNERIA, Micheli. - TAPE-GRASS. EEL-GRASS.

604 V. spiralis, L. In shallow water. St. Stephen, *Vroom.*

LXXVI. ORCHIDACEÆ.

291. MICROSTYLIS, Nutt. - ADDER'S-MOUTH.

605 M. ophioglossoides, Nutt. Several places in Kent, Fredericton; Eel River and Grand Lake, *Hay.*

606 M. monophyllos, Lind. Little Rocher, *Brittain, Vroom.* Have no specimen.

292. LIPARIS, L. - - - - TWAYBLADE.

607 L. Lœselii, Richard. Harris Cove, Lily Lake, *Fowler;* St. Stephen, Fredericton, *Vroom;* Grand Lake, Kennebeccasis, Eel River, *Hay.*

293. CALYPSO, Salisb. - - - - - CALYPSO.

608 C. borealis, Salisb. Rare. "Collected at Somerset Vale, Bathurst, by J. Meehan, 1881; also a fine bunch from vicinity of Indiantown, as early as 1861, by one of Prof. C. F. Hartt's pupils." Many specimens found in Highland Park, near St. John, by G. U. Hay, 1882; also at Petit-

codiac by Mr. Vroom. Bulletin I. 22. Two specimens collected in Odell's Grove, Fredericton, in Herb. *Dr. Bailey.*

294. CORALLORHIZA, R. Brown. - CORAL-ROOT.

609 C. innata, R. Br. Scarce. Black River in Northumberland Co., Carleton, *Fowler*, Herb.; Andover, *Wetmore.*

610 C. multiflora, Nutt. Rather common in Kent Co., *Fowler;* St. John, *Hay*, Herb.

295. LISTERA, R. Brown. - - - TWAYBLADE.

611 L. cordata, R. Brown. Rare. Kouchibouguac, *Fowler;* Dorchester, *Hay*, Herb.

612 L. convallarioides, Hook. On the brink of a densely shaded brook near the Manse, Bass River, *Fowler;* Upper St. John and Madawaska River, *Hay*, Herb.; near Campbellton, *Chalmers.*

296. SPIRANTHES, L. - - LADIES' TRESSES.

613 S. latifolia, Torr. Titusville, *Brittain*, Herb.; Andover and Tobique River, *Hay*, *Wetmore;* Eel River, Carleton Co., *Hay;* North Mountain, *Vroom.*

614 S. Romanzoviana, Chamisso. Kouchibouguac, Richibucto, *Fowler;* Campbellton, and St. John and King's Co.'s, *Hay*, Herb.

615 S. gracilis, Bigel. Baie Verte, *A. I. Trueman*, Herb., Bulletin I. 22; Petitcodiac, *Brittain.*

297. GOODYERA, R. Brown. RATTLESNAKE-PLANTAIN.

616 G. repens, R. Brown. Sugar Loaf, Restigouche Co., and Bass River, *Fowler;* Long Lake, St. John Co., Upper St. John and Tobique, *Hay*, Herb.; St. Stephen, St. George, St. James', St. David's, *Vroom;* Tobique River, Clifton and Chipman, *Wetmore.*

617 G. pubescens, R. Br. Petitcodiac, *Brittain*, Herb.

298. ARETHUSA, L. - - - - ARETHUSA.

618 A. bulbosa, L. Scarce. Richibucto, Fredericton, *Fowler;* Norton, *Hay*, Herb.; Chipman, *Wetmore;* Musquash, St. John Co., *D. McL. Smith.*

299. CALOPOGON, R. Br. - - - CALOPOGON.

619 C. pulchellus, R. Br. Bogs. Richibucto, Kouchibouguac, Herb.; Tay's Mills, York Co., *Moser.*

300. POGONIA, Juss. - - - - - POGONIA.

620 P. ophioglossoides, Nutt. Scarce. Richibucto, Fredericton, *Fowler;* Clifton, abundant about Tomlinson Lake, Andover, *Wetmore;* Tay's Mills, York Co., *Moser.*

301. ORCHIS, L. - - - - - - ORCHIS.

621 O. spectabilis, L. Keswick, *Rev. Mr. McKiel;* Eel River, Carleton Co., *Hay*, Herb., Bulletin II. 30.

302. HABENARIA, Willd.

622 H. tridentata, Hook. Common in Kent, *Fowler;* St. John Co., *Hay.*

623 H. viridis, R. Brown, var. bracteata, Reichenbach. Taborville, Petitcodiac, Havelock, *Brittain*, Bulletin III. 32; Tobique Forks, *Wetmore.*

624 H. hyperborea, R. Br. Harris Cove, *Fowler;* Upper St. John, *Hay*, Herb.; Andover, *Wetmore.*

625 H. dilatata, Gray. Common. Kouchibouguac, Lily Lake, *Fowler;* Campbellton, Herb.; Tobique and Eel Rivers, *Hay;* Chipman, *Wetmore;* between Pabineau and Grand Falls on the Nepisiquit, *Dr. Bailey*, Can. Nat. 1864, p. 94.

626 H. obtusata, Richardson. Coal Branch, Kent Co., *Fowler;* Campbellton, *Chalmers;* Bald Mountain, Tobique, and St. John Co., *Hay*, Herb.

627 H. Hookeri, Torr. Kouchibouguac, Kingston, Kent Co., Grand Lake, Salmon River, *Fowler;* Petitcodiac, *Brittain*, Herb.

628 H. orbiculata, Torr. Bass River, *Fowler;* Loch Lomond, *Hay*, Herb.; Nepisiquit Lakes, Eel River, York Co., *Hay*, Bulletin II. 30; Clifton and Tobique River, *Wetmore.*

629 H. blephariglottis, Hook. Kouchibouguac, Maryland road near Fredericton, *Fowler;* Tay's Mills, York Co., *Moser;* Chipman, *Wetmore.*

630 H. lacera, R. Br. Kouchibouguac, *Fowler;* Petitcodiac and Hampton, *Brittain*, Herb.; common between Au Lac and Port Elgin, Bulletin III. 32.

631 H. psycodes, Gray. Common in wet meadows and bogs, Kent, *Fowler;* Norton, *Hay*, Herb.

632 H. fimbriata, R. Br. Rare. Bass River.

303. CYPRIPEDIUM, L. - { LADY'S SLIPPER. MOCASSIN-FLOWER.

633 C. parviflorum, Salisb. Rare. Restigouche, *Fowler;* Tobique near Pokiok, *Dr. Bailey*, Can. Nat. 1864, p. 82, 83.

634 C. pubescens, Willd. Rather rare. Galloway, near Richibucto, *Fowler;* Edmundton, *Hay,* Herb.; common at Andover, *Wetmore.*

635 C. spectabile, Swartz. St. John Co., *Fowler, Hay,* Herb.; Restigouche, *Chalmers;* York and Carleton Co.'s, *Vroom;* Andover and Tobique River, *Wetmore.*

636 C. acaule, Ait. Rather common. Black River, Northumberland Co., Fredericton, *Fowler;* Lily Lake, *Hay,* Herb.; with white fls., St. Francis River, *Hay,* Bulletin II. 25.

LXXVII. IRIDACEÆ.

304. IRIS, L. - - - - - BLUE-FLAG.

637 I. versicolor, L. Abundant in wet places throughout the Province.

305. SISYRINCHIUM, L. . BLUE-EYED GRASS.

638 S. Bermudiana, L. Among grass everywhere.

LXXVIII. LILIACEÆ.

306. SMILAX, Tourn. - - CARRION-FLOWER.

639 S. herbacea, L. Rothesay, Fredericton, *Fowler;* rather common along St. John River, St. Hilaire, *Hay,* Herb., Bulletin II. 28.

307. POLYGONATUM, Tourn. - SOLOMON'S-SEAL.

640 P. biflorum, Ell. Fredericton, *Fowler;* St. Stephen, *Vroom,* Herb.; common at Salmon River and Andover, *Wetmore;* St. Francis and Upper St. John, *Hay,* Bulletin II. 25; Petitcodiac, *Brittain.*

308. STREPTOPUS, Michx. - TWISTED-STALK.

641 S. amplexifolius, DC. Kent and Northumberland, *Fowler;* Campbellton, *Hay,* Herb.; Lancaster, Herb. *Mrs. Heustis;* rather common at Salmon River, *Wetmore;* Tobique, *Dr. Bailey,* Can. Nat. 1864, p. 83, Bald Mountain, p. 87.

642 S. roseus, Michx. Very common in northern counties, *Fowler;* St. John and King's, *Hay,* Herb.

309. SMILACINA, Desf. - FALSE SOLOMON'S-SEAL.

643 S. racemosa, Desf. Bass River, *Fowler;* Welsford, *Hay,* Herb.; Nerepis Valley, Herb. *Mrs. Heustis.*

644 S. stellata, Desf. Moist banks, Kouchibouguac, *Fowler;* intervales, Salmon River, *Wetmore;* St. John River, Kennebeccasis, *Hay;* Petitcodiac, *Brittain;* Cedar Brook on Tobique, *Dr. Bailey,* Can. Nat. 1864, p. 86. Indian Falls, Nepisiquit, l. c. p. 92.

645 S. trifolia, Desf. Kouchibouguac and Hudson's Brook, Kent Co., *Fowler;* St. John Co., *Hay,* Herb.

646 S. bifolia, Ker. Very common throughout.

310. HEMEROCALLIS, L. - - - DAY-LILY.

647 H. FULVA, L. Occasionally escapes from gardens.

311. ALLIUM, L. - - - ONION. GARLIC.

648 A. tricoccum, Ait. Hampton and Petitcodiac, *Brittain,* Herb.; Eel River, Carleton Co., *Hay,* Bulletin II. 30.

649 A. Schœnoprasum, L. Pabineau Falls on Nepisiquit, and Rothesay, *Fowler;* Nauwigewauk, *Hay,* Herb.; very common along Upper St. John, Tobique and Eel Rivers, *Hay,* Bulletin II. 28; Indian Falls of Nepisiquit, *Dr. Bailey,* Can. Nat. 1864, p. 92; Hammond River, *D. McL. Smith.*

312. LILIUM, L. - - - - - - - LILY.

650 L. Canadense, L. Common on intervales and moist meadows. Herb.

313. ERYTHRONIUM, L. - DOG'S-TOOTH VIOLET.

651 E. Americanum, Smith. Have not noticed it in northern counties except a single plant near Hudson's Brook, Kent Co., abundant at Fredericton, *Fowler;* near St. John and at Norton on Kennebeccasis, *Hay,* Herb.; St. John, Herb. *Mrs. Heustis.*

314. TOFIELDIA, Huds. - - FALSE ASPHODEL.

652 T. glutinosa, Willd. Flat Lands, Restigouche, *Chalmers;* along Upper St. John, Eel and Tobique Rivers, *Hay,* Herb., Bulletin II. 27.

315. UVULARIA, L. - - - - - BELLWORT.

653 U. sessilifolia, L. St. John and King's, *Hay,* Herb.; Lily Lake, Herb. *Mrs. Heustis;* Kouchibouguac and Grand Lake, *Fowler.*

316. CLINTONIA, Raf. - - - Clintonia.

654 C. borealis, Raf. St. John and King's, *Hay*, Herb.; St. John, Herb. *Mrs. Heustis;* Kouchibouguac, *Fowler;* along Tobique River, *Dr. Bailey*, Can. Nat. 1864, p. 83, 86. Bald Mt., p. 87, between Pabineau and Grand Falls, p. 94.

317. MEDEOLA, Gronov. - Indian Cucumber-root.

655 M. Virginica, L. Kouchibouguac and Bass River, *Fowler;* St. John, *Hay*, Herb.

318. TRILLIUM, L. - Three-leaved Nightshade.

656 T. erectum, L. Have not noticed it in the northern counties, though Chalmers sends it from Restigouche. Common about St. John, Loch Lomond, St. Croix River, *Fowler;* Upper St. John and tributaries, Norton, *Hay*, Herb.; St. John, Herb. *Mrs. Heustis;* Tobique near Pokiok, *Dr. Bailey*, Can. Nat 1864, p. 82. Bald Mt., p. 87.
var. alba from Eel River, Carleton Co., *W. T. L. Reed.*

657 T. cernuum, L. Gallows Hill near Napan, Northumberland Co., Bass River, Oxbow on Salmon River, *Fowler;* common on river flats at Andover and Salmon River, *Wetmore;* St. Francis and Kennebeccasis, Norton, *Hay*, Herb., Bulletin II. 25; Tobique at Two Brooks, *Dr. Bailey*, Can. Nat. 1864, p. 85.

658 T. erythrocarpum, Michx. Common, especially in recently burned grounds in northern counties, *Fowler;* St. John and King's Co., *Hay*, Herb.; St. John, Herb. *Mrs. Heustis.*

319. VERATRUM, Tourn. - { Indian Poke. / White Hellebore.

659 V. viride, Ait. Rather common on intervales, Restigouche, Richibucto, St. John and Kennebeccasis Rivers.

320. ZYGADENUS, Michx. - - - Zygadene.

660 Z. glaucus, Nutt. Sand beach at Belledune.

LXXIX. PONTEDERIACEÆ.

321. PONTEDERIA, L. . - Pickerel-Weed.

661 P. cordata, L. Kennebeccasis, near railway station, Fredericton, Grand Lake, *Fowler;* several places on the St. John River, Tobique Lake, Norton, *Hay*, Herb.; Herb. *Mrs. Heustis;* common in western parts of Charlotte Co., *Vroom;* Clifton Lake, *Wetmore.*

LXXX. XYRIDACEÆ.

322. XYRIS, L. - - - YELLOW-EYED GRASS,

662 X. flexuosa, Muhl., var. pusilla, Gray. Kendrick's Lake, near St. Stephen, *Vroom*, Herb.; Pointe de Bute, Westmorland, *A. I. Trueman.*

LXXXI. JUNCACEÆ.

323. JUNCUS, L. - - - RUSH. BOG-RUSH.

663 J. effusus, L. Abundant in marshy ground.
var. conglomeratus, Gray. Less common. Fredericton and elsewhere.

664 J. filiformis, L. Richibucto, Kouchibouguac, *Fowler;* Woodstock, *Hay*, Herb.; Salmon River, *Wetmore.*

665 J. Balticus, Dethard. Common on the coast of Kent.

666 J. Stygius, L. Peat bogs at Richibucto and Point Escuminac, *Fowler*, Herb.; Andover and Salmon River, *Wetmore;* near St. John, *Hay.*

667 J. bufonius, L. Very common throughout. *Hay*, Herb.

668 J. Gerardi, Loisel. Salt marshes at Kouchibouguasis, *Fowler;* St. John, *Hay*, Herb.

669 J. tenuis, Willd. Common. Hopewell Cape, *Hay*, Herb.; Andover, *Wetmore.*
var. secundus, Gray. Bass River, *Fowler;* Salmon River, *Wetmore.*

670 J. Greenii, Oakes & Tuckerm. Wet sandy places, Kouchibouguasis, Kent Co., *Fowler*, Herb.

671 J. pelocarpus, E. Meyer. Bocabec, *Wetmore;* Quaco, *Brittain.*

672 J. articulatus, L. Hampton, Petitcodiac, Baie Verte, *Brittain;* Clifton, *Wetmore.*

673 J. nodosus, L. Restigouche, *Fowler;* Campbellton, Herb.; Andover and Salmon River, *Wetmore;* Green River, Upper St. John, *Hay.*

674 J. Canadensis, J. Gay, var. longicaudatus, Engelm. Common in Kent.
var. coarctatus, Engelm. Rather common in Kent, *Fowler;* Bocabec and Chipman, *Wetmore.*

324. LUZULA, DC. - - - - WOOD-RUSH.

675 L. pilosa, Willd. Common in old fields.

676 L. parviflora, Desv., var. melanocarpa, Gray. Upper Gaspereaux and Blissville, Perth, Victoria Co., *Wetmore.*

677 L. campestris, DC. Dry fields. Common.

LXXXII. TYPHACEÆ.

325. TYPHA, Tourn. - - - CAT-TAIL. FLAG.

678 T. latifolia, L. Common in wet muddy places throughout.

326. SPARGANIUM, Tourn. - - BUR-REED.

679 S. simplex, Hudson. In wet places and borders of lakes. St. John Co., *Hay*, Herb.
var. Nuttallii, Engelm. In water, Bass River, *Fowler;* Welsford, *Hay*, Herb.
var. androcladum, Engelm. Norton, *Hay*, Herb.
var. angustifolium, Engelm. Salmon River, *Hay*, *Wetmore* Herb.; Kennebeccasis, Bass River, *Fowler*.

680 S. minimum, Bauhin. Campbellton, *Chalmers*.

LXXXIII. ARACEÆ.

327. ARISÆMA, Martius. - - INDIAN TURNIP.

681 A. triphyllum, Torr. Common. Bass River, Woodstock, *Fowler;* St. John and King's Co.'s, *Hay*, Herb.

328. CALLA, L. - - - CALLA. WATER ARUM.

682 C. palustris, L. In cold muddy places. Grand Falls, St. Francis River and Quispamsis, *Hay;* in Herb. *Mrs. Heustis;* Bulletin II. 32; Andover, Chipman, Clifton, *Wetmore;* Fredericton, Bathurst road N. of Miramichi, *Fowler*.

329. SYMPLOCARPUS, Salisb. - SKUNK-CABBAGE.

683 S. fœtidus, Salisb. Lake Utopia, *Vroom*, Herb.; Mr. G. F. Matthew reports it at Milkish, King's Co., and Dr. Duncan at Nigadoo River, Gloucester Co. "Near Episcopal Church, Lower Hammond River," *Brittain*.

330. ACORUS, L. - - SWEET-FLAG. CALAMUS.

684 A. Calamus, L. Common on borders of lakes and ponds. Kouchibouguac, *Fowler;* Kennebeccasis and Hopewell Cape, *Hay*.

LXXXIV. LEMNACEÆ.

331. LEMNA, L. - - - - - - DUCKWEED.

685 L. trisulca, L. Petitcodiac, *Brittain*.

686 L. minor, L. Petitcodiac, *Brittain*.

687 L. polyrrhiza, L. Sussex, *Brittain*.

LXXXV. ALISMACEÆ.

332. ALISMA, L. - - - WATER-PLANTAIN.

688 A. Plantago, L., var. Americanum, Gray. Common in wet places, Kent, *Fowler;* Campbellton and St. John, *Hay*, Herb.

333. SAGITTARIA, L. - - - ARROWHEAD.

689 S. variabilis, Engelm. Several forms or vars. of this extremely variable species occur. Common in water or soft mud.

690 S. calycina, Engelm., var. spongiosa, Engelm. Near the head of the tide in the Richibucto River, and at Rothesay, *Fowler*, Herb.; Tobique River, *Hay*.

691 S. graminea, Michx. In water, Rothesay, and in a small lake near Richibucto, *Fowler*, Herb.; Grand Lake and Upper St. John, *Hay;* Clifton, *Wetmore.*

LXXXVI. NAIADACEÆ.

334. TRIGLOCHIN, L. - - - ARROW-GRASS.

692 T. palustre, L. Rather rare. Belledune, *Fowler*; Carleton, *Hay*, Herb.; Andover, Tobique River, *Wetmore.*

693 T. maritimum, L. Common in salt marshes along the coast, *Fowler*; Carleton, *Hay*, Herb.

335. SCHEUCHZERIA, L.

694 S. palustris, L. Soft peat bogs. Richibucto, Fredericton, *Fowler*; Tay's Mills, York Co., *Moser*; St. Stephen, *Vroom*; McAdam Junction, *Hay.*

336. POTAMOGETON, Tourn. - - PONDWEED.

695 P. natans, L. In slow flowing water, Salmon River, Kent Co.

696 P. Claytonii, Tuckerman. Rather common. Hampton and Salmon River, *Fowler*; Norton, *Hay*, Herb.

697 P. Spirillus, Tuckerman. In the Kennebeccasis at Norton, *Fowler*; Lake Utopia and Salmon River, *Wetmore.*

698 P. hybridus, Michx. St. James and St. Stephen, *Vroom.*

699 P. rufescens, Schrader. St. Stephen, *Vroom.*

700 P. lonchites, Tuckerman. Tobique Lakes, *Hay.* *Fide* Prof. Macoun.

701 P. gramineus, L. In flowing water at Coal Branch, Kent Co., *Fowler*; Tobique River, *Hay*; Salmon River, *Wetmore.*

702 P. praelongus, Wulfen. Bass River, Kent Co.; Tobique Lake, *Hay.*

703 P. perfoliatus, L. Ponds and slow streams, Norton, *Hay*, Herb.

704 P. compressus, L. Still and slow flowing water, St. John.

705 P. obtusifolius, Mertens and Koch. Very rare. Little Rocher, *Brittain.*

706 P. pauciflorus, Pursh. Restigouche. The specimens are without fruit and therefore doubtful.

707 P. pusillus, L. Little Rocher, *Brittain.*
var. major, Fries. St. Stephen, *Vroom.*

708 P. pectinatus, L. Harris Cove, *Matthew;* Norton, *Fowler.*

709 P. Robbinsii, Oakes. Petitcodiac and Hampton, *Brittain*, Herb.; Tobique Lakes, *Hay.*

337. RUPPIA, L. - - - - - DITCH-GRASS.

710 R. maritima, L. Growing under water in estuaries of rivers flowing into the Gulf.

338. ZANNICHELLIA, Micheli. - HORNED PONDWEED.

711 Z. palustris, L. Growing under water in streams rendered brackish by the tides. Richibucto, *Fowler;* Spurr's Cove, *Fowler*, *Hay*, Herb.

339. ZOSTERA, L. - EEL-GRASS. GRASS-WRACK.

712 Z. marina, L. Growing under water in shallow bogs along the Gulf coast.

340. NAIAS, L.

713 N. flexilis, Rostk. Potter's Lake, St. Stephen, *Vroom.*

LXXXVII. ERIOCAULONACEÆ.

341. ERIOCAULON, L. - - - - PIPEWORT.

714 E. septangulare, With. Lily Lake, *Fowler;* Dark Lake, *Hay*, Herb.; Welsford, Herb. *Mrs. Heustis;* St. Stephen, *Vroom.*

LXXXVIII. CYPERACEÆ.

342. CYPERUS, L. - - - - - GALINGALE.

715 C. diandrus, Torr. Fredericton, *Wm. Massie.*

716 C. phymatodes, Muhl. Sandy bank of Kennebeccasis, Norton, Fredericton, *Fowler*, *Vroom.*

343. DULICHIUM, Richard.

717 D. spathaceum, Pers. Very wet places. Kent, *Fowler;* Norton, *Hay*, Herb.

344. HELEOCHARIS, R. Brown. - SPIKE-RUSH.

718 H. Robbinsii, Oakes. Kendrick's Lake and Potter's Lake near St. Stephen, *Vroom*, Herb.

719 H. obtusa, Schultes. Muddy places. Common.

720 H. palustris, R. Br. Common, both the large form, which grows in water, and the smaller form in wet grassy places.

721 H. tenuis, Schultes. On a wet bank, Kouchibouguac, *Fowler;* Tobique Lakes, *Hay;* Petitcodiac and Hampton, *Brittain.*

722 H. acicularis, R. Br. Muddy shores and ditches, common, *Fowler;* Spurr's Cove, *Hay*, Herb.

723 H. pygmæa, Torr. Brackish marshes and shores, Kent Co.

345. SCIRPUS, L. - - BULRUSH. CLUBRUSH.

724 S. cæspitosus, L. Richibucto, *Fowler;* Lily Lake, *Hay*, Herb.

725 S. Clintonii, Gray. Madawaska, *Hay;* Digdeguash, St. Patrick, *Vroom* Herb.

726 S. subterminalis, Torr. Petitcodiac, Quaco, *Brittain*, Herb.

727 S. pungens, Vahl. Common on salt or brackish shores.

728 S. validus, Vahl. In still fresh water. Common.

729 S. maritimus, L. Salt marshes. Common.

730 S. microcarpus, Presl. Common. Kent, *Fowler;* Campbellton, *Hay*, Herb.

731 S. atrovirens, Muhl. Wet meadows and bogs. Norton, Fredericton, *Fowler;* Grand Manan, *Hay*, Herb.

732 S. rufus, (Blysmus rufus, L.) Marshy ground at mouth of Eel River, Restigouche Co., Herb.

346. ERIOPHORUM, L. - - - COTTON-GRASS.

733 E. alpinum, L. Grand Falls of Nepisiquit and near St. John, *Fowler;* St. Francis and Lily Lake, *Hay*, Herb.; shaded hillside at Andover, *Wetmore.*

734 E. vaginatum, L. Common in bogs. Kent, Carleton, *Fowler*, Herb.; Lancaster, *Mrs. Heustis.*

735 E. russeolum, Fries. Bog near Richibucto, *Fowler;* Cape Bald, Port Elgin, Hillsborough, Cape Enrage, *Brittain;* Chipman, *Wetmore.*

736 E. Virginicum, L. Common in bogs in northern counties, *Fowler;* Lily Lake, *Hay*, Herb.

737 E. polystachyon, L. Common throughout the Province.

738 E. gracile, Koch. Rather common. Bass River, *Fowler;* Lancaster, *Hay*, Herb.

347. RHYNCHOSPORA, Vahl. - - BEAK-RUSH.

739 R. fusca, Roem & Schultes. Near Hampton, *Brittain*, Herb.

740 R. alba, Vahl. Peat bogs. Near Richibucto, *Fowler;* border of Clifton Lake, *Wetmore.*

348. CAREX, L. - - - - - - - SEDGE.

741 C. gynocrates, Wormskiold. Restigouche, *Chalmers;* Arthurette, *Wetmore.*

742 C. pauciflora, Lightfoot. Bog near St. John, *Fowler;* mouth of Madawaska, *Hay*, Herb.; Chipman, *Wetmore.*

743 C. polytrichoides, Muhl. Rather common. Bass River, *Fowler;* Spurr's Cove, *Hay*, Herb.

744 C. bromoides, Schk. Petitcodiac, Pollet River and Portage, *Brittain;* Arthurette and Salmon River, *Wetmore.*

745 C. teretiuscula, Good. Swamps. Kouchibouguac, *Fowler;* Salmon River, *Wetmore.*

746 C. vulpinoidea, Michx. Near St. John, *Matthew.*

747 C. stipata. Muhl. Common. Bass River, *Fowler;* Norton, *Hay*, Herb.

748 C. rosea, Schk. Petitcodiac and Portage, *Brittain.*

749 C. arcta, Boot. Petitcodiac and Hampton, *Brittain.* Determined by Prof. Macoun.

750 C. tenella, Schk. Damp shady grounds, Bass River.

751 C. trisperma, Dew. Swamps and woods. Bass River, *Fowler;* Carleton, *Hay*, Herb.

752 C. tenuiflora, Wahl. Tobique River, *Hay;* Petitcodiac, *Brittain.*

753 C. canescens, L. Common. Bass River, *Fowler;* Lily Lake, *Hay*, Herb.

var. vitilis, Gray. Common. Bass River, *Fowler;* Carleton, *Hay*, Herb.; rather common at Salmon River, *Wetmore.*

754 C. Norvegica, Schk. Marshy ground, Shediac, *Brittain.* Determined by Prof. Macoun.

755 C. Deweyana, Schw. Bass River, *Fowler;* Petitcodiac, *Brittain*, Herb.; Gaspereaux River, Salmon River, *Wetmore;* Aroostook Falls, *Hay.*

756 C. sterilis, Willd. Petitcodiac, *Brittain.* Determined by Prof. Macoun.

757 C. stellulata, L. Petitcodiac, *Brittain.*
var. scirpoides, Gray. Common in Kent, *Fowler;* Carleton, *Hay*, Herb.; Petitcodiac, *Brittain.*
var. angustata, Gray. Wet ground, Bass River.

758 C. scoparia, Schk. Very common. Bass River, *Fowler;* Campbellton, Herb.
var. minor, Boot. Sent from Restigouche by *Chalmers.*

759 C. lagopodioides, Schk. Bass River, *Fowler*, Herb.; not rare at Salmon River, *Wetmore.*
var. moniliformis, Boot. Bass River.

760 C. cristata, Schw. Tobique River, *Hay.*

761 C. adusta, Boot. Richibucto River; Bass River, *Fowler;* Nepisiquit Lakes and Lower Tobique, *Hay* (the var. glomerata); Petitcodiac, *Brittain*, Herb. There are two forms of this Carex as determined by Col. S. Olney, one of which he identifies as C. albolutescens, Schw., var. glomerata, Olney, the other as var. sparsiflora, Olney. Both are found in Kent Co.

762 C. fœnea, Willd., var. sabulonum, Gray. (C. silicea, Olney.) Sand beaches on the coast. Kouchibouguac, *Fowler*, Herb.

763 C. straminea, Schk., var. typica, Gray. Kouchibouguasis, *Fowler*, Herb.; McAdam Junction, *Hay;* Fredericton Junction, *Fowler.*
var. tenera, Gray. Kent Co. Rather rare.
var. festucacea, Gray. St. John, *Hay*, *Fowler*, Herb.; Digdeguash, *Hay.*

764 C. vulgaris, Fries. Bass River, Carleton, *Fowler*, Herb.

765 C. aquatilis, Wahl. Kent Co., St. John Co., Harris Cove.

766 C. torta, Boot. Salmon Creek and Gaspereaux River, *Wetmore;* Petitcodiac, *Brittain.*

767 C. aperta, Boot. Near Richibucto, *Fowler;* rather common at Salmon River, *Wetmore.*

768 C. stricta, Lam. Richibucto, Fredericton, *Fowler;* Norton, *Hay*, Herb.; Salmon River, *Wetmore.*
var. strictior, Gray. Tobique and Salmon Rivers, *Wetmore.*

769 C. lenticularis, Michx. Bass River, *Fowler*, Herb.; not rare at Salmon River, *Wetmore;* St. Stephen, *Vroom.*

770 C. salina, Wahl. Salt marsh at Molus River, Kent Co. Only found it once.

771 C. maritima, Vahl. Salt marshes, Molus River, *Fowler;* Lancaster, *Hay*, Herb.

772 C. crinita, Lam. Along rills and brooks. Common. Kouchibouguac, *Fowler;* Norton, *Hay*, Herb.

773 C. gynandra, Schw. Tobique River, *Hay* and *Chalmers.*

774 C. limosa, L. Peat bogs, Richibucto, Bass River, *Fowler*, Herb.

775 C. irrigua, Smith. Peat bogs, Kent Co., *Fowler;* Lily Lake, *Hay*, Herb.

776 C. Buxbaumii, Wahl. Restigouche near mouth of Upsalquitch, *Fowler;* Lily Lake, *Hay*, Herb.

777 C. atrata, L. Madawaska River, *Hay;* Tobique, *Wetmore.*

778 C. aurea, Nutt. Near St. John, *Fowler;* Kennebeccasis Island, *Hay*, Herb.; Andover and Minister's Face, *Wetmore.*

779 C. panicea, L. Wet meadows, Bass River.

780 C. granularis, Muhl. Wet grounds, Bass River, *Fowler;* College grounds, Fredericton, *Wetmore;* Sussex, *Brittain.*

781 C. pallescens, L., var. undulata, Gray. Bass River, *Fowler;* Aroostook Falls, Carleton, *Hay*, Herb.

782 C. gracillima, Schw. Bass River, *Fowler;* Tobique, *Hay.*

783 C. laxiflora, Lam. Several vars. and forms of this exceedingly variable plant are found, but they have not been worked out. More material is required.

784 C. oligocarpa, Schk. Bellisle and Petitcodiac, *Brittain.*

785 C. pedunculata, Muhl. Petitcodiac, Havelock, *Brittain;* Red Bank and Salmon River, *Wetmore;* St. Stephen, *Vroom;* Nashwaaksis, *Moser.*

786 C. umbellata, Schk. Rocky ground near the Manse at Blackville, *Fowler;* Red Bank, *Wetmore;* Petitcodiac, *Brittain.*

787 C. Novæ-Angliæ, Schw. St. John, *Fowler*, *Hay*, Herb.; Petitcodiac, *Brittain;* Chipman, *Wetmore.*

788 C. Emmonsii, Dew. Dry bank near Manse, Blackville, *Fowler;* Petitcodiac, *Brittain;* Salmon River, *Wetmore.*

789 C. Pennsylvanica, Lam. Dry knolls in woods between Richibucto and Molus River, *Fowler;* not rare at Salmon River on dry banks, *Wetmore.*

790 C. varia, Muhl. Dry knolls in woods, Bass River, Fredericton Junction, *Fowler;* rather common at Salmon River, *Wetmore.*

791 C. pubescens, Muhl. Petitcodiac, *Brittain.*

792 C. scabrata, Schw. Wet grounds, Bass River, *Fowler;* Norton, *Hay;* Campbellton, Herb.

793 C. arctata, Boot. Margin of dry woods beside Manse, Bass River, *Fowler*, Herb.; rather common at Salmon River, *Wetmore;* St. John, *Hay;* various places in Westmorland, *Brittain*, Bulletin III. 36.

794 C. debilis, Michx. Bass River, Fredericton, *Fowler;* Carleton, *Hay*, Herb.; common at Salmon River, *Wetmore.*

795 C. capillaris, L. Bass River, *Fowler;* Edmundton, *Hay*, Herb.; Kennebeccasis Bay, *Wetmore.*

796 C. flexilis, Rudge. Near Weldford Station, *Fowler*, Herb.; Red Bank Creek and Tobique River, *Wetmore;* common at Petitcodiac, *Brittain.*

797 C. flava, L. Common in damp meadows. St. John, *Matthew;* Bass River, *Fowler*, Herb.

798 C. Œderi, Ehrh. Rothesay, on shore, *Fowler;* Carleton, Hay, Herb.; Tobique, *Wetmore.*

799 C. filiformis, L. Lake Elsie near Richibucto, *Fowler*, Herb.; Arthurette, *Wetmore.*

800 C. lanuginosa, Michx. Moncton and Petitcodiac, *Brittain*, Herb.; Edmundton, *Hay.*

801 C. Houghtonii, Torr. Dry grassy places, Coal Branch, Kent Co., *Fowler*, Herb.; Tobique River at Pokiok, *Wetmore.*

802 C. riparia, Curtis. In water near Weldford Station.

803 C. Pseudo-Cyperus, L. Frequent along borders of lakes and in ditches in Kent Co., *Fowler;* Long Lake, St. John Co., and McAdam Junction, *Hay.*

804 C. hystricina, Willd. Lily Lake, *Fowler;* Welsford, *Hay*, Herb.

805 C. tentaculata, Muhl. Abundant along the shore near Bass River Bridge.

806 C. intumescens, Rudge. Rather common in Kent, *Fowler;* King's Co. and on St. John River, *Hay*, Herb.

807 C. lupulina, Muhl. Hampton and Norton, *Fowler*, *Hay*, Herb.

808 C. folliculata, L. Norton, *Fowler*, *Hay*, Herb.; St. Martin's, *Brittain*, Herb.

809 C. rostrata, Michx. Bog at Rothesay, *Fowler;* Lily Lake, *Hay*, Herb.; border of Clifton Lake, *Wetmore.*

810 C. retrorsa, Schw. Common in wet places at Bass River, *Fowler*, Herb.

811 C. utriculata, Boot. Swampy places, Bass River, Fredericton, *Fowler;* Norton, *Hay*, Herb.

812 C. Vaseyi, Dew. Borders of Lake Elsie near Richibucto.

813 C. monile, Tuck. Wet places at Bass River and Fredericton, *Fowler;* Salmon River, *Hay.*

814 C. Tuckermani, Boot. Wet bank of Bass River near Bridge.

815 C. oligosperma, Michx. In a peat bog near Richibucto, *Fowler*, Herb.; Madawaska, *Hay.*

816 C. miliaris, Michx. Wet shores at Rothesay and on opposite side of river, *Fowler*, Herb.

817 C. longirostris, Torr. Andover, *Wetmore;* Sussex, *Brittain.*

LXXXIX. GRAMINEÆ.

349. PANICUM, L. - - - - PANIC-GRASS.

818 P. GLABRUM, Gaudin. Fredericton, on railway track, *Fowler;* Nashwaaksis, *Moser;* Hampton, *Brittain*, Herb.; Salmon River, *Wetmore.*

819 P. capillare, L. A weed in gardens and cultivated grounds, Bass River.

820 P. dichotomum, L. In dry fields and woods. Common in Kent.

350. OPLISMENUS, Beauv. - COCK-SPUR GRASS.

821 O. CRUS-GALLI, Kunth. (Panicum Crus-galli, L.) A very variable and troublesome weed about barnyards and gardens.

351. SETARIA, Beauv. - BRISTLY FOX-TAIL GRASS.

822 S. VERTICILLATA, Beauv. Reported by *Hay* on ballast, St. John.

823 S. GLAUCA, Beauv. A common weed in gardens and manured grounds, Bass River.

824 S. VIRIDIS, Beauv. Gardens and cultivated grounds, Bass River.

352. SPARTINA, Schreb. - CORD OR MARSH GRASS.

825 S. cynosuroides, Willd. Marshes, especially near the coast, Kent Co.

826 S. juncea, Willd. Salt marshes, Kouchibouguac, Richibucto.

827 S. stricta, Roth., var. alterniflora, Gray. Salt marshes, Richibucto.

353. ZIZANIA, Gronov. - WATER OR INDIAN-RICE.

828 Z. aquatica, L. Abundant in water at Hampton and other places in King's Co., *Brittain*; not rare at Salmon River, *Wetmore.*

354. LEERSIA, Solander. - - RICE CUT-GRASS.

829 L. oryzoides, Swartz. Wet banks of streams, Bass River.

355. ANDROPOGON, L. - - - BEARD-GRASS.

830 A. scoparius, Michx. Goat Island in Grand Lake.

356. PHALARIS, L. - - - CANARY-GRASS.

831 P. CANARIENSIS, L. Spreading from ballast at St. John.

357. ANTHOXANTHUM, L. - SWEET VERNAL-GRASS.

832 A. ODORATUM, L. Common in grass fields and pastures. Bass River.

358. HIEROCHLOE, Gmelin. - - HOLY-GRASS.

833 H. borealis, Roem & Schultes. Molus River, Richibucto and elsewhere in Kent Co.

359. ALOPECURUS, L. - - FOXTAIL-GRASS.

834 A. geniculatus, L. Wet places. Carleton.

835 A. aristulatus, Michx. Wet places. Bass River.

360. STIPA, L. - - - - FEATHER-GRASS.

836 S. Richardsonii, Link. Petitcodiac, *Brittain.*

361. ORYZOPSIS, Michx. - - MOUNTAIN RICE.

837 O. asperifolia, Michx. Fredericton Junction and Port Elgin, *Fowler*; Petitcodiac, *Brittain*; common at Salmon River in blueberry barrens, *Wetmore.*

362. MILIUM, L. - - - - MILLET-GRASS.

838 M. effusum, L. Richmond, Carleton Co., *Vroom.*

363. MUEHLENBERGIA, Schreb. DROP-SEED GRASS.

839 M. glomerata, Trin. Weldford, Kent Co., banks of Kennebeccasis.

840 M. Mexicana, Trin. Fredericton, *Fowler;* Petitcodiac, *Brittain*, Herb.

841 M. sylvatica, Torr. & Gr. Low rocky places, Fredericton, *Fowler;* Bellisle, King's Co., *Brittain.*

364. BRACHYELYTRUM, Beauv.

842 B. aristatum, Beauv. Rocky woods, Molus River, Kent Co.

365. PHLEUM, L. - TIMOTHY. HERD'S-GRASS.

843 P. PRATENSE, L. Cultivated for hay.

366. AGROSTIS, L. - - - - BENT-GRASS.

844 A. scabra, Willd. Common throughout.

845 A. canina, L. Molus River, Kent Co., in dry barrens.

846 A. vulgaris, L. Abundant in old or dry fields.

847 A. alba, L. In damp grassy ground, Bass River.

367. CINNA, L. - - - WOOD REED-GRASS.

848 C. arundinacea, L., var. pendula, Gray. In deep shady places, Molus River, Bass River.

368. DEYEUXIA, Clarion. - REED BENT-GRASS.

849 D. Canadensis, (Calamagrostis Canadensis, Beauv.) The most abundant grass in wild meadows.

850 D. stricta, (Calamagrostis stricta, Trin.) Shediac, *Brittain.*

369. AMMOPHILA, Host. - - .SEA SAND-REED.

851 A. arenaria, Host. (Calamagrostis arenaria, Roth.) St. John, *Hay;* Kouchibouguac, *Fowler.*

370. DESCHAMPSIA, Beauv. - - HAIR-GRASS.

852 D. flexuosa (Aira flexuosa, L.) On rocks near the mouth of the Kennebeccasis.

853 D. cæspitosa (Aira cæspitosa, L.) Kennebeccasis, Tabusintac on the Bathurst road, Restigouche.

371. TRISETUM, Persoon.

854 T. subspicatum, Beauv., var. molle, Gray. On rocky banks, Restigouche, *Fowler;* Upper Gaspereaux, *Wetmore;* Upper St. John, *Hay.*

372. AVENA, L. - - - - - - - OAT.

855 A. striata, Michx. Bass River, Tabusintac on Bathurst road, *Fowler;* Upper St. John, *Hay;* Petitcodiac, *Brittain,* Bulletin II. 32.

373. DANTHONIA, DC. - - WILD OAT-GRASS.

856 D. spicata, Beauv. Dry barren commons. Bass River.

374. PHRAGMITES, Trin. - - - - REED.

857 P. communis, Trin. Restigouche, *Chalmers;* St. Stephen *Vroom;* Sackville, Herb. *Mrs. Heustis.*

375. EATONIA, Raf.

858 E. Pennsylvanica, Gray. Scarce. Restigouche, Kennebeccasis.

376. DACTYLIS, L. - - - ORCHARD-GRASS.

859 D. GLOMERATA, L. Fields and yards. Bass River.

377. POA, L. - MEADOW-GRASS. SPEAR-GRASS.

860 P. annua, L. A troublesome weed in gardens and cultivated grounds.

861 P. compressa, L. Harvey, York Co., Fredericton Junction, St. John, *Fowler;* Bellisle, *Brittain.*

862 P. cæsia, Smith. Taborville, King's Co., *Brittain.*

863 P. serotina, Ehrh. Along brooks in damp fields, Bass River, *Fowler;* Hampton, *Brittain.*

864 P. pratensis, L. Bass River, *Fowler;* common about Petitcodiac, *Brittain.*

865 P. TRIVIALIS, L. Introduced in ballast at Richibucto.

866 P. debilis, Torr. Petitcodiac, *Brittain.*

378. GRAPHEPHORUM, Desv.

867 G. melicoides, Beauv. Petitcodiac and Titusville, *Brittain,* Herb.

379. GLYCERIA, R. Brown. - - MANNA-GRASS.

868 G. Canadensis, Trin. Common in bogs and very wet places.

869 G. elongata, Trin. Bass River, *Fowler;* Salmon River, *Wetmore.*

870 G. obtusa, Trin. St. Stephen, *Vroom.*

871 G. nervata, Trin. In damp grounds and meadows, Bass River, St. John.

872 G. pallida, Trin. In water, Petitcodiac, *Brittain.*

873 G. aquatica, Smith. In water and very wet places, Bass River.

874 G. fluitans, R. Brown. In shallow water, Bass River; St. John.

875 G. maritima, Wahl. Frequent on sea coast of Kent.

876 G. distans, Wahl. Salt marshes, Bathurst, St. John.

380. FESTUCA, L. - - - FESCUE-GRASS.

877 F. ovina, L., var. duriuscula, Gray. Scarce. Richibucto, *Fowler;* Moncton and Shediac, *Brittain.*

878 F. ELATIOR, L., var. PRATENSIS, Gray. In fields, Fredericton.

879 F. nutans, Willd., Lower Norton, *Brittain.* Have no specimen.

381. BROMUS, L. - - - - BROME-GRASS.

880 B. SECALINUS, L. Rare in wheat fields, Bass River.

881 B. RACEMOSUS, L. Among wheat, Bass River.

882 B. ciliatus, L. On intervales, Bass River, *Fowler;* Salmon River, *Wetmore.*

382. LOLIUM, L. - - DARNEL. RYE-GRASS.

883 L. PERENNE, L. Near railway depot, Carleton, *Hay.* No specimen.

884 L. TEMULENTUM, L. Near railway depot, Carleton, *Hay.* Almost the only noxious grass known. No specimen.

383. TRITICUM, L. - - - - - - WHEAT.

885 T. repens, L. A very troublesome weed on sandy soil. Varies greatly, especially on the sea coast.

886 T. caninum, L. On intervales, Coal Branch, Kent Co.

384. HORDEUM, L. - BARLEY. SQUIRREL-TAIL GRASS.

887 H. jubatum, L. Sandy soil along the Gulf shore.

385. ELYMUS, L. - LYME-GRASS. WILD-RYE.

888 E. Virginicus, L. On intervales, Hampton, Coal Branch.

889 E. Canadensis, L. University Herb. Sussex and Petitcodiac, *Brittain;* Eel River, Carleton Co., *Hay.*

890 E. mollis, Trin. Sand beaches, Kouchibouguac, *Fowler;* Restigouche, *Chalmers.*

386. ASPRELLA, Willd. - BOTTLE-BRUSH GRASS.

891 A. Hystrix, Willd. (Gymnostrichum Hystrix, Schreb.) Eel River, Carleton Co., *Hay.*

CRYPTOGAMIA.

CLASS III.—ACROGENOUS CRYPTOGAMS.

XC. EQUISETACEÆ.

387. EQUISETUM, L. - HORSETAIL. SCOURING RUSH.

892 E. arvense, L. Very common in damp soil.

893 E. pratense, Ehrh. Restigouche River, *Chalmers.*

894 E. sylvaticum, L. Very common throughout.

895 E. limosum, L. Rather common. Kent, *Fowler;* Tobique Lakes, Carleton, *Hay*, Herb.; Nepisiquit Lakes, *Bailey*, Can. Nat. 1864, p. 90.

896 E. hyemale, L. Rather rare. Bass River, *Fowler;* Drummond, Victoria Co., *Hay.*

897 E. scirpoides, Michx. Common about River Charlo and Point Le Nim, *Fowler*, Herb.

XCI. FILICES.

388. POLYPODIUM, L. - - - - POLYPODY.

898 P. vulgare, L. Common in clefts of rocks near St. John. In the northern counties I have only seen it at one spot at Bass River, *Fowler;* Island in Nictau Lake, *Hay.*

389. ADIANTUM, L. - - - - MAIDENHAIR.

899 A. pedatum, L. Upper Restigouche and Upper St. John, Keswick Ridge, *Fowler;* Andover, *Hay*, Herb., Bulletin II. 30; Moose Mountain, Carleton Co., *Dr. Bailey;* Daley's Woods near Woodstock, *Hay.*

390 PTERIS, L. - - - - BRAKE OR BRACKEN.

900 P. aquilina, L. Our most abundant Fern, everywhere.

391. PELLÆA, Link. - - - - CLIFF-BRAKE.

901 P. gracilis, Hook. Cold damp clefts of densely shaded rocks. Morris Rock, Restigouche, Grand Falls, St. John, *Fowler;* Woodstock and Madawaska, *Hay.*

392. ASPLENIUM, L. - - - - SPLEENWORT.

902 A. viride, Hudson. Clefts of rocks, Tattagouche Falls, Gloucester Co., Green Head near St. John, and Drury's Cove, *Fowler;* found at several stations about St. John, *Hay*, Herb.

903 A. thelypteroides, Michx. Rich shady woods, Bass River, *Fowler;* Fredericton, *Vroom*, Herb.; Salmon River (Victoria Co.) and Woodstock, *Hay.*

904 A. Filix-fœmina, Bernh. Very common throughout.

393. SCOLOPENDRIUM, Smith. - HART'S TONGUE.

905 S. vulgare, Smith. Near Woodstock, James Sutton, 1881, Herb. Presented to Herb. by Peter Jack, Esq , of Halifax, Bulletin II. 30.

394. PHEGOPTERIS, Fee. - - - BEECH-FERN.

906 P. polypodioides, Fee. Common throughout. Carleton, *Hay*, Herb.

907 P. Dryopteris, Fee. Common throughout. Carleton, *Hay*, Herb.

395. ASPIDIUM, Swartz. - SHIELD-FERN. WOOD-FERN.

908 A. Thelypteris, Swartz. In wet places, Bass River, *Fowler;* Green Head, Herb.

909 A. Noveboracense, Swartz. Rather common. Kouchibouguac, Bass River, *Fowler;* Lily Lake, *Hay*, Herb.

910 A. fragans, Swartz. Have only found it in clefts of rocks at the railway tunnel in Restigouche. Said to be found near Dalhousie.

911 A. spinulosum, Swartz, var. intermedium, Eaton. Our common form found everywhere.

var. dilatatum, Eaton. Not common. Bass River, *Fowler;* St. John, *Hay*, Herb.

912 A. cristatum, Swartz. Scarce. Bass River, Green Head, *Fowler*, *Hay*, Herb.; Andover and Upper Gaspereaux, *Wetmore.*

913 A. Goldianum, Hook. Near Woodstock. Presented to Herb. by Mr. Peter Jack, Herb., Bulletin II. 31.

914 A. Filix-mas, Swartz. Keswick Ridge, *Moser*, *Hay*, Herb.; Daley's wood, Richmond, *Hay.*

915 A. marginale, Swartz. Rather common. Bass River, *Fowler;* Gondola Point, *Hay*, Herb.; St. Stephen, *Vroom.*

916 A. acrostichoides, Swartz. In the northern counties I have only noticed a single tuft near Molus River, Kent Co., *Fowler;* Upper Tobique, common near St. John, Kennebeccasis, *Hay*, Herb.; Mosquito Cove, Herb. *Mrs. Heustis;* Andover, common at Salmon River, *Wetmore.*

917 A. aculeatum, Swartz, var. Braunii, Koch. Not rare. Sugar Loaf in Restigouche, Odell's Grove, Fredericton, *Fowler*, *Moser*, Herb.; St. Francis River, Andover and Salmon River, *Hay*, *Wetmore*, Bulletin II. 25; Campbellton, *Chalmers*, Herb.

396. CYSTOPTERIS, Bernhardi. - BLADDER-FERN.

918 C. bulbifera, Bernh. Damp shaded ravines, Restigouche, St. John, *Fowler;* very abundant about Lower St. John, Coldbrook, *Hay*, Herb.

919 C. fragilis, Bernh. Rather common. Coal Branch, Kent Co., *Fowler;* Campbellton, Herb.; St. John and tributaries, *Hay;* Fredericton, *Vroom.*

397. STRUTHIOPTERIS, Willd. - OSTRICH-FERN.

920 S. Germanica, Willd. Common in rich alluvial soil, Kent Co., *Fowler;* very abundant on low grounds of Tobique, mouth of St. Francis, *Hay*, Bulletin II. 25; on Tobique River, *Dr. Bailey*, Can. Nat. 1864, p. 83.

398. ONOCLEA, L. - - - - SENSITIVE-FERN.

921 O. sensibilis, L. Rather common in northern counties, *Fowler;* common on St. John and tributaries, Campbellton, *Hay*, Herb.; along Tobique River, *Dr. Bailey*, Can. Nat. 1864, p. 83, 85.

var. obtusilobata, Torr. Richibucto, *Fowler;* Havelock, King's Co., *Brittain*.

399. WOODSIA, R. Brown. - - - WOODSIA.

922 W. Ilvensis, R. Br. Restigouche on Sugar Loaf and at mouth of Upsalquitch, *Fowler;* St. Stephen, *Vroom;* found at Keswick, Nashwaaksis and near Green Head, St. John, *Hay;* in Herb. *Mrs. Heustis;* Minister's Face, Kennebeccasis, Bulletin II. 29; very abundant about Lower Tobique, *Hay*.

923 W. hyperborea, R. Br. Rare. At tunnel in Restigouche, *Fowler;* Aroostook Falls, *Hay* and *Wetmore*, Bulletin II. 29, Herb.; Grand Falls, *Peter Jack*. This fern was given as W. glabella in former list through a mistake in copying the label.

400. DICKSONIA, L'Her. - - - DICKSONIA.

924 D. punctilobula, Kunze. Very common in pastures, roadsides and open woods.

401. OSMUNDA, L. - - - FLOWERING-FERN.

925 O. regalis, L. Swamps and wet places. Bass River, Fredericton, *Fowler;* Upper Tobique and Campbellton, *Hay*, Herb.; St. John, Herb. *Mrs. Heustis;* Tobique, *Dr. Bailey*, Can. Nat. 1864, p. 83.

926 O. Claytoniana, L. Very common throughout. Lancaster, *Hay*, Herb.

927 O. cinnamomea, L. Very common in swamps in northern counties, *Fowler;* Campbellton, *Hay*, Herb.

var. frondosa, Gray. Beautiful specimens showing every step of the change from the common sterile form of frond to forms having several of the upper pinnæ completely fertile were once found by the writer at Molus River, Kent Co.

402. BOTRYCHIUM, Swartz. - - MOONWORT.

928 B. lanceolatum, Augstroem. Bass River near Manse, Fredericton, at Salamanca, *Fowler*, *Vroom*, Herb.; Kennebeccasis, *Hay*.

929 B. matricariæfolium, A. Br. Petitcodiac, St. Martin's, *Brittain*, Herb. Reported from near Dalhousie.

930 B. Virginicum, Swartz. Rather common. Bass River, *Fowler;* Eel River, Victoria Co., *Hay*, Herb.; St. John, Herb. *Mrs. Heustis;* on dry rocky heights at the mouth of the Upsalquitch is a reduced form only a few inches high, B. gracile, Pursh.

931 B. lunarioides, Swartz. Rather common. Bass River, Miramichi, Fredericton.

932 B. simplex, Hitchcock. Is said to be found near Dalhousie, but the writer has not seen it.

403. OPHIOGLOSSUM, L. - ADDER'S-TONGUE.

933 O. vulgatum, L. Hopewell and Cape Enrage, *Brittain*, Herb.

XCII. LYCOPODIACEÆ.

404. LYCOPODIUM.

934 L. lucidulum, Michx. Common in Kent, *Fowler;* Brookville, *Hay*, Herb.

935 L. Selago, L. Among grass on Carleton Heights, *Fowler*, Herb.

936 L. inundatum, L. Bass River and several places in Kent, *Fowler*, Herb.; not rare at Salmon River, *Wetmore*.

937 L. annotinum, L. In dry woods, common. *Fowler*, Herb.

938 L. dendroideum, Michx. Rather common. Bass River, *Fowler*, Herb.

939 L. clavatum, L. In dry woods, common. Bass River, *Fowler*, Herb.

940 L. complanatum, L. In dry woods. Common in Kent, *Fowler;* Campbellton, Herb.

405. SELAGINELLA, Beauv.

941 S. rupestris, Spreng. Keswick, *Burnett*, 1881. Herb.

406. ISOETES, L. - - - - - QUILLWORT.

942 I. echinospora, Durieu, var. Braunii, Engelm. Rather common in Charlotte Co., *Vroom*.

APPENDIX.

List of Plants, mostly of European origin, found on ballast or spreading from ballast deposits, together with a few spontaneous in gardens or escaping from them.

Aconitum Napellus, L. Spontaneous in gardens, *Fowler*, *Vroom.*

Papaver dubium, L. Ballast, Buctouche, *Fowler.*

Papaver Rheas, L. Spontaneous in garden at Manse, Bass River, *Fowler.*

Glaucium luteum, Scop. Ballast, St. John, *Hay.*

Adlumia cirrhosa, Raf. Spontaneous in gardens wherever it is introduced.

Erysimum orientale, R. Brown. Apparently permanent on ballast heaps, Richibucto, *Fowler.*

Diplotaxis tenuifolia, DC. Ballast, Richibucto, *Fowler;* St. John, *Hay.*

Diplotaxis muralis, DC. Ballast, Richibucto, *Fowler;* St. John, *Hay.*

Brassica campestris, L. Ballast, St. John, *Hay.*

Tilia Europea, L. Planted for ornament.

Ampelopsis quinquefolia, Michx. Extensively planted for ornament, but has not yet been found wild.

Trifolium resupinatum, L. Ballast, St. John, *Fowler.*

Trifolium ornithopodioides, L. Ballast, St. John, *Fowler.*

Lotus corniculatus, L. Fairville, 1877, *Fowler;* ballast, St. John, *Hay*, 1881, Herb.

Ornithopus scorpioides, L. Occurring in a garden at St. Stephen the past two seasons, *Vroom*, Herb., Bulletin III. 33.

Ribes aureum, Pursh. Cultivated for ornament.

Bupleurum rotundifolium, L. Ballast, St. John, *Hay.*

Carum Carui, L. Becoming a very troublesome weed in several places in St. John Co.

Helianthus tuberosus, L. Spontaneous about garden fences.

Anthemis tinctoria, L. Ballast, St. John, *Hay.*

Chrysanthemum Parthenium, Pers. In gardens, scarcely wild.
Chrysanthemum Coronarium, L. Ballast, St. John, *Hay*, Herb.
Chrysanthemum segetum, L. Ballast, St. John, *Hay*, Herb.
Senecio Jacobæus, L. Firmly established at Newcastle, Miramichi.
Senecio viscosus, L. Spreading rapidly at Bathurst and Shediac.
Carduus crispus, L. West side Courtenay Bay, *Hay*.
Onopordon Acanthium, Vaill. Ballast at Buctouche.
Silybum Marianum, Vaill. In gardens.
Lampsana communis L. Ballast, St. John, *Hay*.
Crepis virens, L. Ballast, St. John.
Tragopogon pratensis, L. In a field, St. Stephen, *Vroom*.
Borago officinalis, L. Escaped from gardens in a few places.
Physalis pubescens, L. Found occasionally in gardens.
Linaria Cymbalaria, Mill. Ballast Wharf, St. John, *Hay*, 1881.
Linaria minor, Desf. Ballast Wharf, St. John, *Hay*, 1881.
Mimulus moschatus, Dougl. Alma, *Brittain*. Probably outcast from a garden.
Satureia hortensis, L. Found growing on a railroad embankment near Hillsborough, *Brittain*.
Galeopsis Ladanum, L. Ballast, St. John, *Hay*.
Mercurialis annua, L. Spread from ballast at Buctouche.
Daphne Mezereum. Near Fredericton, *W. T. L. Reed*.
Salix acutifolia, L. Planted for ornament, Kent Co.
Populus dilatata, Ait. Often planted under the name of Lombardy Poplar.
Populus alba, L. White Poplar or Abele. Often planted. Spreads by the roots.

ARTICLE II.

ABSTRACT OF PAPER ON SURFACE GEOLOGY OF FREDERICTON.

By W. T. L. Reed.

[*Read April* 1, 1884.]

AT the Race Course — a flat at the foot of the hills on the south west side of Fredericton, a section made by a small water course exposes the following series of beds:

		8. Sandy loam,	1 ft.	10 in.
		7. Friable sandy clay,	1	4
No remains.	c	6. Rust-spotted clay, somewhat sandy,	0	9
		5. Rusty greyish brown sand,	1	0
No remains.	b	4. Coarse sand,[1]	0	7
dark slate-colored beds with vegetable remains.	a	3. Fine sandy clay,	1	0
		2. Coarse sand, somewhat sticky from clay,	2	0
		1. Fine sandy clay,	0	6
		0. Blue clay, thickness unknown.		
			9 ft.	0 in.

In the lower part of this section there is no bed composed of vegetable matter entirely, but the remnants of trees and plants are scattered thickly through the sand and clay in a bed a little over three feet in thickness. A few entangled trees held fast in the mud may have formed the nucleus into which drifted other trees, grasses, seeds, leaves and twigs, becoming a tangled mass which gradually sank to the bottom. Among the fragments are found the maple, elm, yellow and white birch, spruce, fir, cedar, etc.; the appearance of the wood and size of the leaves indicate a growth similar to the present. It is evident that these remains were the drift of the lake, for while some show no wear, others are stripped of their bark, and fragments of wood, split and rounded, tell us of a journey over the rocky bed of some dashing stream. * * * * * The blue clay (No. 0) is of great depth in the central part of the valley, for in an attempt to sink an artesian well a point 125 feet below the surface was reached without getting through the clay. This (blue clay) is overlaid in many places by a clay more or less reddish in color, which is used for making bricks. Both of these clays after being subjected to the heat of the blow-pipe are attractable by the magnet and not a trace of soda could be detected in any of the tests made. [This remark relates to blue clay taken near the surface.] At the time the vegetable matter was being buried the shallow lake was taking on a river-like aspect. Though from a mile to three miles wide at this part, the water moved more rapidly and was digging a channel in the clay; sand bars were forming, and during the deposition of the bed (*c*) it is probable a sand bar had shut off the current from this part of the lake [1] except in times of flood.

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[1] 100 feet down the gully this band is 1 foot 6 inches thick.

This body of water, whether a fresh water lake or an inlet of the sea, at one time was very deep, but had become very shallow, partly from the filling up with sediment and partly from the falling of the water. There is evidence to show that this decrease of water was not wholly gradual, but one time at least the water, probably by the breaking away of some barrier, suddenly retired, leaving a considerable space on which rain and frost would act with great effect. * *

From the washing of the hills there would be a mingled deposit of sand and clay along the shores, but nearer the middle of the lake, where the current was greater, the deposit would be of sand entirely; and this is verified by observation: in the central part of the valley I find sand lying directly on the fine clay, and often the sand is very coarse, containing pebbles, while near the hills all the strata are generally more or less clayey. * * * * This Acadian lake, of which Grand Lake, with a score of smaller lakes and ponds, is a remnant, was larger by far than any existing lake of the Maritime Provinces * * * * occupying an area of not less than 300 square miles. In form it was right-angled, one arm extending from the Jemseg to the Keswick, the other from the Jemseg to the Gaspereaux River.[2] * * * *

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[1] Mr. Reed argues that these deposits were made in a large lake extending from Keswick Valley to Grand Lake.—EDITOR.

[2] At the head of Grand Lake.—EDITOR.

ARTICLE III

ON THE ZOOLOGY OF THE INVERTEBRATE ANIMALS OF PASSAMAQUODDY BAY.

By W. F. Ganong, B.A.

[*Read Sept.* 2, 1884.]

THE Zoology of the Marine Invertebrates of New Brunswick has been, in one section at least, well studied. The Island of Grand Manan, lying near the mouth of the Bay of Fundy, with the tides and currents of the Atlantic washing its shores; having numerous outlying islands with sheltering bars and reefs, which thus give every variety of bottom, affords exceptional facilities for the study of marine life. That its advantages are appreciated by American scientists is evinced by the fact that not a summer now passes without one or more parties, either representing some university or working upon their own account, visiting the Island for the purposes of dredging and study. Some years ago a very complete catalogue of the invertebrate life of the surrounding waters was prepared by Dr. Stimpson and published among the Smithsonian "Contributions." He enumerates some sixty-four (64) species of Radiates, one hundred and forty-two (142) of Molluscs, and one hundred and seventeen (117) of Articulates, many of which were new species. Friar's Bay also, lying between Eastport and Campobello, and swept by the tide pouring through Lubec Narrows and around the North of Campobello, has been thoroughly dredged and the results published from time to time; but with these exceptions the Zoology of the Marine Invertebrata of the Southern coast of New Brunswick is comparatively unknown.

Passamaquoddy Bay, the "great pollock water" of the Indians, has never, so far as I have been able to learn, previous to this year, been sounded by the naturalist's dredge. Lying at the South-Western corner of Charlotte Co., with a length of fifteen and breadth of seven miles, it receives the water of four rivers and many smaller streams, and is filled by the tide twice each day through four narrow channels. The degree of hardness of the surrounding rocks is very favorable to the existence of a great variety of life, for they consist largely of soft, easily eroded conglomerates and sandstones, which are carried away by the strong tides and deposited among the islands, forming pebble, sand, and mud bottoms, while numerous trap dykes afford rugged reefs and ledges.

In order to obtain specimens for study two methods are adopted, that of searching the tide pools and of dredging. As the tide ebbs it leaves pools among the rocks from which the water never entirely runs out, but leaves enough for the support of the animal life therein until the next flood tide refills it. Wading into these and turning over flat stones, pushing aside the great matted masses of seaweed, or peering into little hollows and caves in the ledges, the observer can study the living specimens in a way that is not possible when they are roughly dredged from the bottom. But very many species inhabit considerable depths, and then the dredge or trawl must be used. A few words as to the method adopted in dredging may not be out of place here.

The instrument used consists of an iron framework two feet long and six inches broad, made in such a form that a broad scraping surface always rests on the bottom, while behind there drags a fine net which catches everything that the scraper loosens. The boat being brought up into the wind until there is little headway, the dredge is let go until it rests on the bottom. Then the sail is allowed to fill and rope is allowed to run out to the length of between twice and thrice the depth of the water, its amount depending largely upon the character of the bottom. If the latter be muddy, just enough rope must be used to allow the dredge to just scrape the surface or go to a slight depth, for if too much is given out the iron jaws sink deep into the mud and act as an anchor. In such a case the rope must be allowed to run out freely while the boat is brought around upon the opposite tack, and it is lifted as an anchor would be. If, however, the bottom be sandy or pebbly less care is required, and the dredger soon comes to know the character of the bottom by the feeling of the rope and can regulate its amount accordingly.

In considering the Zoology of the Invertebrates of the Bay, I have deemed it best to endeavor to present to you an idea of its general character, together with some observations upon the habits of the more common species, reserving more detailed and more technical considerations until further study will enable me to treat the subject with greater fullness and precision.

Of the mollusca some fifty species have been found, so far, in the Bay. Of the Tumcata or sac-molluscs some three species occur, including the beautiful *Cynthia pyriformis*, known among the fishermen as the "sea-peach," and no production of the sea has been more appropriately named. For when taken fresh from the dredge it has the delicate velvety bloom of a perfectly ripe peach, and the resemblance is still further increased by its being fixed by a short stem. Floating pieces of wood and stakes of weirs are found bored by a species of Teredo, which is a true mollusc, although likely at first sight to be taken for an annelid. At Frye's Island a broad and strong tide-dam was completely undermined and destroyed by them within the space of six years.

The next family, the Solenidæ, is represented by but one species, the razor fish (*Solen ensis*), which occurs in the sand at low water on Hospital Island. Uncovered only at the lowest tides, and possessing the power of moving with great rapidity by means of the large muscular "foot," they are extremely difficult to obtain, and for this reason are less used as an article of food than they otherwise would be. Far more abundant and obtained with much greater ease, and too well known to all of you to require any description, is the common clam (*Mya arenaria*). Filling every available locality where there are flats of fine sand and mud, there is probably not a single mile of coast on the Bay where they do not occur, their presence at any point being shown by the dead shells thrown up by the tide and by the little holes out of which they send a tiny stream of water from their siphons when disturbed. They were an important article of food to the Indians before the advent of the Europeans, as shown by the numerous and large shell heaps on the shores of the Bay. Their white successors, however, do not make such extensive use of them, but in case of famine or dearness of food from other causes they would become of great economic value.

Not less interesting to the naturalist is the somewhat rare shell *Thracia Conradi*, a bivalve larger than the clam, of a dingy white color, and living on muddy bottoms. The protean *Saxicava rugosa*, living among rocky ledges, has no two individuals alike, each one conforming itself to the irregularities of the cavity in which it lies

In great abundance on muddy bottoms below low water mark dwells the longitudinally ribbed, nearly circular *Astarte sulcata.* The larger and darker colored smoother *Cyprina Islandica* is less abundant but in similar situations, as is also the strongly radiate-ribbed *Cardita borealis.* A few specimens of the translucent *Yoldia sapolilla* have been found, and also several of the almost transparent, many toothed *Leda tenuisculata.*

Passing to the Mussel family (Mytilidæ), the Bay affords at least four species, of which far the most abundant is the edible mussel (*Mytilus edulis*). Crowded closely together above ground and clinging by the firm byssus, they occupy great beds, all of a dull black color except where a lighter colored specimen of the variety *pellucidus* is more conspicuous than its fellows. The nearer low water mark the larger they are, while they are found at their fullest perfection by dredging in four or five fathoms. In Gould's Invertebrata of Massachusetts the general length is given as 2 4-10 inches, but I have found them in abundance 3 1-2 inches long and even larger. Closely resembling it, but perfectly distinct in generic and specific characteristics, is the large horse-mussel (*Modiola modiolus*). This is a large rough shell, almost invariably having attached to it various sea weeds or colonies of bryozoa and corallines. In the Invertebrata of Massachusetts it is said to inhabit deep water, probably upon a rocky or pebbly bottom. The existence of a large and well situated tide pool on Pendleton's Island has enabled me to see the animal under the actual conditions under which it lives. At this place the tide leaves, for about an hour, a hollow in the rocks of an average depth of about a foot and extent of about 900 square feet. Here great numbers of the horse-mussel may be found, with its long and tough byssus so firmly fixed among the pebbles and small boulders of the bottom that it requires a very considerable amount of strength to tear it from its resting place, and then the byssus never gives way, but brings up with it the large mass of material to which it is attached. It lies about half imbedded in the bottom, gaping wide open, while every shell is rough with growths of nullipores, bryozoa, lamenaria and other parasite organisms.

Among the most delicately marked of our shells, especially when seen under a lens of moderate magnifying power, is the small *Modiolaria nexa*, the massing of the fine lines of the shell forming what has been termed a "beautiful network of hexagonal indentations." Hardly less delicate is the marking of the smaller *Crenella glandula*, with its fine radiating lines on the exterior, and the interior pearl-like with a finely crenulate margin.

In the next family (the Pectenidæ) comes another of our important food molluscs, the scallop (*Pecten tenuicostatus*). Very abundant in L'Etang and Chamcook harbors upon muddy bottoms, at depths of from five to eight fathoms, they are but seldom dredged. Highly esteemed in parts of the United States, they are little known and appreciated among ourselves, but the mollusc that is most appreciated, the oyster, is not found in the Bay. With regard to the latter, the conditions here seem to be unfavorable for its existence, for many years ago a large number were brought from abroad and placed in the Bay, and not only did they not increase, but those placed there soon died. We have, however, two species of the same family as the oyster, the little pearly *Anomia ephippium* and the closely allied *Anomia aculeata*, both of them found attached to shells of the scallop.

In the class Brachiopoda we have but one family and in that but one species, dredged in twelve fathoms in Friar's Cove, *Terebratula septentrionalis*. They occur there clinging together in bunches, large and small together, and seem to prefer the clear fresh water upon pebbly bottoms. This species was regarded by Dr. Gould as identical with the European *Terebratulina caput-serpentis*. This, however, is still a disputed point. If it is so, it is the oldest in time of all living mollusca. Huxley says of it: "The longest line of human ancestry must hide its diminished head before the pedigree of this insignificant shell-fish. We Englishmen are proud to have an ancestor who was present at the battle of Hastings. The ancestors of *Terebratulina caput-serpentis* may have been present at a battle of *Ichthyosauria* in that part of the sea which, when the chalk was forming, flowed over the site of Hastings. While all around has changed, this *Terebratulina* has peacefully propagated its species from generation to generation, and stands to this day as a living testimony to the continuity of the present with the past history of the globe."

In the class Gasteropoda we have first the delicate little bubble shell *Cylichna alba*, which occurs at a depth of ten fathoms at several points. Two species of Chiton (*Chiton ruber* and *Chiton* *albus*) are abundant in the large tide pool on Pendleton's Island, clinging to the rocks and to one another. As a general rule these are only obtained either by dredging or from the stomachs of fishes, but here they can be seen and studied as they actually live. This pool, to which I refer so frequently, teems with animal life, and a most interesting paper could be written upon its inhabitants alone.

Common everywhere on muddy bottoms is the trumpet-shaped *Entalis striolata*, and common everywhere in the littoral zone is the common limpet (*Tectura testudinalis*). The latter seems to attain a larger size here than elsewhere, for Dr. Gould says that the largest specimens he ever saw were 1 1-4 inches long, while I have collected them more than 1 1-2 inches in length. Perhaps the only one of the marine Gasteropods occurring in the Bay, that is eaten by civilized man, is the periwinkle (*Littorina littorea*). It is very abundant between high and low water mark, clinging to the rocks and seaweed, and seems to require to be exposed to the air for a certain length of time every day, as it is never dredged from deep water. This latter peculiarity is common to it together with several species, such as the purple shell, the limpet and others. The large round whelk (*Lunatia heros*) is found in many places, but most abundantly at Minister's Island, while *Lunatia triseriata*, formerly regarded as the young of *Lunatia heros*, is abundant among the shells of clams at several points. As the identity of *L. triseriata* with the young of *L. heros* is still a matter of dispute, the following facts, which seem to prove them to be distinct species, though closely allied, may be of interest.

(1). Specimens distinctly marked with the three dark lines of *L. triseriata* are found of far greater size than others of similar shape without the markings, which could hardly be the case were the former the young of *L. heros*.

(2). *L. triseriata* is found in large numbers burrowing in the sand among clams and lob-worms. While I have never found any specimens without the three lines in that situation, I have found them on the beach at low water mark, which would seem to indicate that burrowing in the sand is the proper habitat of *triseriata*, which is thus distinct from the unmarked shells, which are, without doubt, the young of *L. heros*.

Of the family Purpuridæ the purple shell (*Purpura lapillus*) from which was obtained the much valued "Tyrian purple" of the ancients, is very common in the littoral zone, and also the long whelk (*Buccinum undatum*), while the small but elegant *Nassa trivittata* is quite abundant at various depths. A single dead specimen of one of the spindle shells (*Fusus Islandicus*) was found at Hospital Island, where the *Fusus decemcostatus* is very abundant. With regard to the latter shell Dr. Gould says: "It is seldom found with the mouth entire * * * * showing that it probably inhabits rocks in deep water." This, however, I have not found to be the case, for at L'Etang harbor I dredged them from a mud bottom in seven fathoms, while at Hospital Island great numbers of living shells occur in the sand at low water, the foot of the animal being buried and the spire of the shell projecting.

In the class Cephalopoda we have the common squid (*Loligo Bartramii*). It is very abundant, and both useful and pernicious to the fishermen—useful because it is easily caught and is the best bait known to them for cod and pollock, and pernicious both from the number of herring it destroys and from the fact that its presence in considerable numbers at any locality keeps these fish from entering the weirs at that place. The fishermen say that it can go backward or forward with equal ease, but this is a mistake. By the forcible ejection of water from a cavity enclosed by the muscular mantle it shoots backward with the swiftness and smoothness of an arrow, while its forward progress is very slow.

Passing to the Articulates, we have very many species of Tubicolæ, the annelids forming tubes in which they live, and of the Maricolæ or free sea-worms, but of most importance and interest are the Crustacea. The common crab (*Cancer pagurus*) is found, though not abundantly, around the mouths of rivers, seeming to prefer the somewhat brackish water to that which comes from the open sea. The lobster (*Homarus Americanus*) is also quite abundant in the pools near low water mark, hiding in cavities under ledges. Along the shores at various points is found the Hermit Crab (*Bernhardus pubescens*) occupying the cast-off shells of whelks and spindle-shells. At certain times in the year the shrimps are very abundant and afford food for the enormous numbers of herring which enter and leave the Bay with each tide. But most abundant of all the marine articulates are the Barnacles (*Balanus balanoides*), which are common everywhere in the littoral zone, and which are so abundant in many places that they give to the rocks a dull white color. But in deeper water they attain much larger size, for at L'Etang harbor they may be dredged in six or seven fathoms of water, attached to shells of scallops or to stones, and as large as the largest walnut. They vary much in external form, as indeed do all shells fixed to any solid body, for they must conform to the irregularities of its surface.

Among the Radiates the Echnoderms are well represented in the Bay. The Holothuroids or sea-cucumbers are mostly of Ispecues, the large brown *Pendacta frondosa* and the elongated nearly transparent *Synapta tenuis*, both of which are abundant at the lowest tides upon Craig's Ledges, a great rugged rock mass about four miles from St. Andrews. The common Sea Urchin (*Toxopneustes drobachiensis*) lines the shore in many places with a dark green carpet of projecting spines, but is most abundant where there is a moderately strong tide-way or current. In many places they may be seen to occupy cavities in the rock, which they fit exactly and which are said to be made by themselves. As these cavities are only found where the tides are strong, it is probable that they are only made for the purpose of keeping the occupants from being swept away; while the constantly flowing tide brings to them a bountiful supply of food. The "Cake Urchin" or "Sand Dollar" (*Echinarachnius parma*) abounds in Chamcook harbor and at Hospital Island, at which latter place great numbers of the dead shells are thrown up upon the beach, together with those of the Hen-clam and Razor-fish.

Of the Asteroids or Star-fishes several species occur. The large red *Asteracanthion rubens* and the small green *A. littoralis* are common everywhere, while the ten-rayed *Solaster endeoa* and the "Sun Star" (*Crossaster papposa*) are found on the reefs around Pendleton's Island. At Friar's Cove the Basket-fish (*Astrophyton Agassizii*) occurs, from whose central disc five arms radiate, which soon divide into two equal branches, which themselves divide, and so on. In one case the continuous bifurcation was traced so far that 81,920 arms were shown to exist, and more beyond that could not be traced. Among the Ophiuroids the graceful, handsomely spotted *Ophiopholis bellis* may be found in abundance in dark pools and under rocks, and the drab colored, slow moving *Ophioglypha Sarsii* may be dredged almost anywhere in about ten fathoms.

The Acalephs are represented by comparatively few species, far the most common being the so-called "Sun-fish" (*Aurelia flavidula*) of which great numbers may be seen floating in the waters of the Bay during the latter part of July and August.

As is well known to you, these animals move by the rapid contraction and slow expansion of the disc. At Campobello I had the good fortune to see the method by which they can move backward. Going along at a rapid rate, and not possessing the sense of sight, one of them suddenly ran into one of the logs of a wharf. Stopping for a moment, and there being no current to carry it off, it began to move backward by contracting its disc, so that it extended as far as possible in the direction in which it wished to go, and then by a quick contraction of the edge drew itself backward, partially turning as it did so by contracting more on one side than the other, until it was clear of the obstruction, when it resumed its normal method of progression.

Around Pendleton's Island there is occasionally found the *Ptychogena lactea*, looking like a white cross on the water. The common sea-anemone (*Metridium marginatum*) occurs at Craig's Ledges, together with some other species, while many species as yet undetermined, of bryozoa, annelids, small crustacea, sertularians, etc., are abundant throughout the Bay.

In considering the Zoology of the Bay as a whole, it may be said that it is extremely rich in animal life, and more especially in the Mollusca, for which reason, as also on account of their greater practical importance, I have devoted more attention to them in this paper than to the Articulates and Radiates. The Bay affords an inexhaustable supply of food-molluscs, the chief reason for their non-utilization at present being that the cod, pollock, herring and other fish are still so abundant, while the cultivation of the land is very far from having reached that point at which the price of grain is raised because the people cannot produce enough for their own subsistence. Owing to the non-enforcement of the law relating to the matter, our only edible articulate, the lobster, is steadily decreasing both in numbers and size. Thus much for the practical aspect. To the naturalist the Bay affords a rich field for investigation, far the greater part of it being still unexamined, my own work having been almost exclusively in the upper part, while the whole extent from St. Andrews to Perry, embracing all that part between Deer Island and the mainland of Washington County, Maine, has never, so far as I have been able to learn, been dredged by any naturalist whatever. The best collecting ground in the Bay is at Craig's Ledges. At this point there is a narrow channel through which Chamcook harbor is filled and emptied.

The rocks consist mostly of much-jointed red sandstones, covered at the point by boulders of various sizes. Here may be found great numbers of the green spine clad sea urchins, red, yellow, green and purple star-fishes, holothurians displaying in some quiet tide pool their magnificent branching feathery tentacles, while on turning over some flat stone, clinging to its under surface is the spotted sand-star, turning its fine, snake-like, fringed arms in rapid and irregular motion, and colonies of bryozoa looking like miniature ranges of red and yellow volcanoes. If one is fortunate enough to find, without disturbing it, a sea-anemone in the water, he will be rewarded by beholding a beautiful sight, for the long and slender tentacles, moving continually, decompose the light and send back to the eye the most varied, lovely and ever-changing hues. And speaking of beauty, that man would be dull indeed who would not be moved to admiration by many of our marine invertebrates. If he love beauty of form, the arrowy flight of the cuttle fish, the slow and measured contraction and expansion of the disc of the jelly fish, the serpentine turning of the rays of the brittle star, the rapid sweep of the arm of the barnacles, will show him grace in motion; the wonderful structure of the interior framework of the rays of the star-fish, resembling the most delicate and perfect Grecian architecture, grace and elegance, fixed and embodied; while the ever-changing, iridescent hues of some of the annelids, the pearly light from the interior of a fresh mussel shell, the effects due to the decomposition and reflection of light by the slender tentacles of the sea-anemone, afford a richness and delicacy of coloring that cannot be surpassed. Very beautiful, too, is the phosphoresence. On a dark night a boat rowed over the water seems to plough through a sea of living fire; long lines of lambent flame run from the bow, while every dip of the oar makes to flash anew the ghostly gleaming water. But if the observer is fortunate enough to behold it at night, when the sky is overcast and the surf rolling in great waves upon the beach, he will see it at its best. All the water is dark except when a wave breaks, and then a line of bluish light is followed by darkness again, while upon the shore itself the water is incessantly alight, and rolling up upon the beach and receding, it leaves the sand carpeted with brilliancy. And all this effect is produced by the tiny bactilinea; such is the power of numbers.

But, after all, how little is really known not only of these but of other forms of animal life. We study their habits and trace many secondary causes, but the "great primary cause," the secret of life itself, is as far from our grasp as ever, and the best that we can hope to do is to enter into what a great English writer calls "the bitter Valley of Humiliation, into which only the wisest and bravest men can descend, owning themselves forever children, gathering pebbles on a boundless shore."

St. Stephen, August 29, 1884.

ARTICLE IV.

AN OUTLINE OF RECENT DISCOVERIES IN THE ST. JOHN GROUP.

By G. F. MATTHEW, M.A., F.R.S.C.

With a Letter of Prof. ALPHEUS HYATT relative to the Pteropods.

[*Read December* 2, 1884.]

FOR some years the Saint John Group has been known as a formation containing the fullest representation of the oldest Cambrian fauna yet discovered in America.

In Europe this very old fauna is well known, but in America the Cambrian rocks which are best known and have been most carefully studied do not contain it. These Cambrian rocks of America are known as the Potsdam sandstone; they cover extensive areas along the valley of the St. Lawrence and in the Middle and Western States, and are thus the oldest Cambrian group, recognized by its fauna, in the central region of North America, but they do not contain any of the species of the St. John Group.

On the shores of Lake Champlain and along the Hudson River another group of Cambrian rocks is found, older than the Potsdam sandstone, but even this, so far as we know, contains none of the St. John species. In short, nowhere west of the Appalachian Mountains have Cambrian strata been met with containing remains of animals of the ancient type of those of the Acadian Provinces.

The crustacean genus Paradoxides is one of the most characteristic forms of this early fauna, and it has thus far been found in America only to the eastward of the Appalachian Chain. One species is known to occur in Massachusetts and three in Newfoundland, but the genus is represented by a greater variety of forms at St. John, N. B., than elsewhere on this continent. This genus is considered to be characteristic of the Lower Cambrian rocks. The late Professor C. F. Hartt, by a study of the fossils of the St. John Group, was able to declare that they were of the same type as those of the Primordeal Zone in Bohemia, which Joachim Barrande had shown to contain the oldest of all known organic remains.[1] But since Prof. Hartt made this determination the fauna of the Primordeal Zone has been further elaborated, and Paradoxides is now found to mark the lower part of the Primordeal or Cambrian System. This fact was ascertained for Central Europe by the illustrious Barrande, and for Great Britain by Mr. J. W. Salter and Dr. Henry Hicks. These savants discovered that while Paradoxides characterized the Lower Cambrian rocks, the Upper Cambrian could be recognized by the presence in it among other fossils of the crustacean genus Olenus. Dr. Hicks went further, and was able to divide the Lower Cambrian formation of Wales into three groups by means of the different assemblages of animals which it contains. He thus established the succession of the groups known as "Cærfai," "Solva" and "Menevian."

Prof. Hartt fixed the age of the St. John Group as nearly as was possible in his time as "Primordeal," or, as we now call it, Cambrian; but these later discoveries in Europe have enabled the writer to point out more exactly the Cambrian group in Wales holding a fauna to which the beds containing the St. John fauna described by Prof. Hartt correspond.[2] This has been shown in an article to the Royal Society of Canada (1884) and elsewhere, and we now know that Hartt's species more nearly represent those of the Solva Group than those of the Menevian. In other words, it is the fauna of the older part of the Lower Cambrian.

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[1] That is the oldest known at that time.

[2] The two groups, one in Wales and the other in Acadia, are not necessarily on that account exactly cotemporaneous.

When we look for a source from which our Lower Cambrian fauna may have been derived we are met with the difficulty that no other large assemblage of animals of greater antiquity is known. The oldest creature known, *Eozoon Canadense*, so far preceded in time the advent of the Cambrian forms of life, that its influence upon them is almost beside the question. It is true that a species resembling *Eozoon Canadense* has been found in the pre-Cambrian rocks of Bavaria, but the genus Eozoon is not known to have left any successors or nearly related forms in the Cambrian limestones, and may therefore be considered as practically extinct at the opening of the Cambrian period.

Coming to more recent times than that represented by Eozoon, there is a geological stage in Newfoundland indicated by the "Intermediate Series" of Mr. Alex. Murray in which a single organism has been found. This Intermediate Series is regarded by Mr. Murray and others as equivalent to the Huronian System of Canada, and therefore intermediate between the Laurentian (the formation containing Eozoon) and the Cambrian. The organic form which occurs in this Intermediate System has been described by the late Mr. E. Billings of the Canadian Geological Survey, who appears to have thought it a representative of the Gasteropods (Sea-snails, etc.) and gave it the name of *Aspidella terranovica.* It is a curious patelliform fossil, which Mr. Billings was unable to refer to any known genus or family, so that its bearing on the question of the origin of the Lower Cambrian or Acadian Fauna of the St. John Group is somewhat problematical.

In the Acadian Fauna of the St. John Group, notwithstanding its antiquity, we do not have the ultimate source of Organic Life, but on the contrary an assemblage of animals already greatly differentiated and adapted to the conditions under which they existed. At the time when the Acadian Fauna flourished there must also have been other areas on the globe occupied by living beings, for when we consider the place and mode of occurrence of the species of the St. John Basin, belonging to Division or Series 1, both described and undescribed, it is clear that there were three successive irruptions of living forms into this area, all of Lower Cambrian type and all strictly within the limit upward of the Paradoxidean Zone. Each of the three sets of organisms in these beds contains a large proportion of distinct species with a smaller number of identical species. The latter serve as connecting links to bind these several sub-faunas together as one connected whole.

Before describing the three assemblages of organic forms that are found in the lower part of the St. John Group, it may be well to give a brief statement of the nature and order of the beds in which they occur. The St. John Group has been divided into six principal masses of strata, designated as Divisions 0, 1, 2, 3, 4 and 5. Of Division or Series 0 it may be said that no organic remains have been found in it; but in Division 1 is found the fauna described by Professor Hartt and others. This fauna is not found at the base of Division or Series 1, but in one of the middle members. Series 1 at St. John has been described as consisting of four bands of strata, differing in the nature of the sediments, and designated respectively in ascending order as *a*, *b*, *c* and *d*. The band *a* is a barren group, and *c* contains the species already described; but both *b* and *d* are now found to have each its own peculiar assemblage of species.

The oldest fauna is found in the band *b*. It is littoral, and its deep-sea equivalent is not known, but its crustaceans differ from those of the next band. The connecting link between the fauna of this band and that of the band *c* above it, is found chiefly in the brachiopods and pteropods. In the fauna of *b* are two new and remarkable types of bivalve crustaceans. The solitary trilobite known, Agraulos (?) is notable for the great development of the axial lobe of the cephalic shield and thorax, and of the close approximation of the eyes to the glabella. In this feature it resembles *Conocoryphe Lyelli* of the Welsh Cambrian strata. Two species of the pteropods display the remarkable feature, in this class, of a camerated shell, and were apparently adapted to resist the accidents of life on a sandy sea shore. As for the brachiopods, we find among them only the most primitive types—Linnarssonia, Lingulella, Acrothele and Acrotreta.

On passing to the beds of band *c* a flood of new forms present themselves, among which are two types of sponges, Protospongia (?) and an undescribed genus. The Cystidian, Eocystites, also appears at this horizon. To the genera of brachiopods referred to as found in band *b* are now added three species of the genus Orthis, and another Lingulella takes the place of that found in band *b*. Among the gasteropods are several genera Stenotheca (?), Scenella, Harttia, etc. The pteropods are well represented in Hyalithoid species of three different types. The bivalve crustaceans have a fair representation; those of the underlying band are not found, but new species appear, including those of the genera Primitia, Leperditia, etc. The trilobites are represented by the most ancient genera:—Agnostus has four species, Microdiscus two, Ptychoparia five or more, Conocoryphe three, an ancient type of Ctenocephalus one, and Paradoxides four; all four of this last genus have continuous eyelobes.

Passing to the beds of the next band, viz., *d*, a change in the fauna is at once apparent, though a connection with the preceding fauna is maintained by the presence of the undescribed sponge, all the pteropods, and of two familiar forms of brachiopods—Linnarssonia and Acrothele; there are also varieties of the Agnosti, the Ptychoparæ, and of Protospongia (?) of band *c*. On the other hand quite a number of new species appear at this horizon, among which may be named a Dendrograpsus (?), another Lingulella (?) and two new species of Stenotheca. Two worm-casts and new species of bivalve crustaceans also come in at this horizon. Among the trilobites also there are new species. The Agnosti have four; Microdiscus exhibits a new form closely allied to *M. punctatus*, Salter. Among the Ptychopariæ some species now appear for the first time, and Solenopleura has a representative. A Paradoxides with *shortened eyelobes* has left abundant fragments in these measures; it is a species which by its pleural spines, pygidium and hypostome is allied to *P. Bohemicus* of Europe.

This new fauna consists largely of forms similar to those of the Menevian Group, and is chiefly remarkable for the great abundance of Pteropods, Microdisci and Agnosti, and for the presence of a Paradoxides with shortened eyelobes. So far as they are at present known, each of these successive sub-faunas has an individuality of its own; that in band *b* contains forms the most remarkable for novelty; band *c* is notable for the variety of species it contains, and band *d* for the abundance of individuals of many of the species. The beds of the band *b* may be said to have been deposited on a sandy shore, those of *c* on a muddy shore, and those of *d* in deeper and more tranquil waters. Volcanic action in the vicinity of the St. John Basin seems to have been dormant during the time when the beds of band *a* were laid down, but awoke into activity during the period when the strata of *b* were deposited, and gradually died away while the olive grey mud beds of *c* were formed. The time when these successive faunas were making their way into the St. John Basin was a period of decreasing volcanic action and of gradual subsidence in that area.

In concluding this article I quote a letter of Prof. Alpheus Hyatt of Boston, well known for his researches among the Cephalopods and Sponges, which relates to one of the new forms noticed in the preceding paper. Prof. Hyatt had very kindly offered to advise me in reference to difficult points connected with the fossils of the St. John Group, and I therefore availed myself of this opportunity to place before him the various specimens of pteropodous shells bearing upon the possible early connection of the pteropods with the cephalopods. Unfortunately the letter giving the details of his examination of these fossils has been lost in transmission, but the general results of the investigation are given in the summary quoted below from a later letter. By way of preface to Prof. Hyatt's letter I may say that more than one of the early pteropods of the St. John Group are remarkable for the presence of several distinct septa at the base of the tube. There are two such species in the band *b;* another, but a longer and narrower kind, is found in the band *c*, and this or a similar camerated shell occurs in the band *d*. Of these species (referring, however, chiefly to the oldest) Prof. Hyatt says (3rd February, 1885):

"I kept no notes of the details I had observed; my results, however, were quite definite in respect to the main points. These were: (1). The fossil is a Hyolithes allied to *H. undulatus*, Barr. Syst. Silur. pl. 11, f. 29. (2). The aspect of a siphon is due to the compression of the sharper against the flatter side and the form of the sutures, which favors this impression. Barrand figures, as I found after arriving at this decision, a similar case, pl. 15, figs. 35, 35*a*, of a closely allied species, *H. elegans.* (3). The sutures are similar to those of *H. elegans* in curvature, but wider apart. These fossils with their distinct septa are startlingly similar to certain forms of Nautiloidea, but there is no siphon. They, however, confirm Von Jhernig's and my opinion that the Orthoceratites and Pteropods have had a common, but as yet undiscovered, ancestor in ancient times."

SUMMARY OF MEETINGS.

FEBRUARY 5TH.

Mr. Matthew read his paper on "Discoveries at a Village of the Stone Age at Bocabec, N. B." This paper was published in Bulletin No. III.

MARCH 4TH.

Mr. W. M. McLean gave an account of the International Fisheries Exhibition held in London, G. B., in the summer of 1883. Canada was well represented at this exhibition. Its fish products were presented in the form of a pyramidal trophy, which attracted much attention. Lectures on fish culture, etc., were given by Mr. Wilmot, who was in charge of the Canadian exhibit.

APRIL 1ST.

Two papers were read on this evening. Mr. F. W. Daniel read a paper on the Gulls. He enumerated nine species, some of which were rare in New Brunswick. Immense numbers of gulls of several species are found in Passamaquoddy Bay and the numerous islands in the mouth of the Bay of Fundy. The second paper of this evening was by Mr. W. T. L. Reed, and gave an account of the Surface Geology in the Valley of the St. John River near Fredericton. An abstract of the paper is published in this Bulletin.

MAY 6TH.

Mr. Robert Chalmers read a paper on " The Origin of the Grand Falls of the St. John River." Mr. Chalmers stated that the Falls had been caused by a diversion of the river from its pre-glacial channel, which had been blocked up by drift during the ice-age. The Falls are slowly working backward and are losing in height as they work back to the old river valley.

JUNE 3RD.

The delegate to the meeting of the Royal Society of Canada gave a report of the proceedings of that Society at the meeting in May last. Dr. L. C. Allison also gave an address on the Rhizopods found in the vicinity of St. John. He attributed the comparative scarcity of Rhizopods in the fresh waters about St. John to the large extent of limestone rocks where the ponds are found near St. John.

SEPTEMBER 3RD.

Mr. W. F. Ganong read a paper on the Invertebrata of Passamaquoddy Bay, which is printed in a preceding part of this Bulletin.

OCTOBER 7TH.

Mr. G. U. Hay read an interesting paper on the results of his botanical explorations in July and August on the tributaries of the St. John. He ascended the Tobique to the source of the Little Tobique (Lake Nictau) in company with Mr. Chalmers of the Geological Survey. Of the fertility of the intervales and terraces along this beautiful river, the luxuriant growth of the grass and plants and trees of many species, give abundant evidence. He ascended two of the highest mountain peaks along the river—Blue Mountain, below the Forks, and Bald Mountain, which rises from Nictau Lake to the height of nearly half a mile. From the summit of these two peaks a broad view can be obtained of a large portion of the centre of the Province, extending to the Restigouche on the north. No distinctly Alpine species of plants were found on the summit of Bald Mountain. In fact, the hills about St. John and along the shores of the Bay of Fundy, nearly 200 miles farther south, and near the level of the sea, have, if anything, more boreal types of plants than has Bald Mountain. No distinct zones of vegetation could be detected on the sides of this mountain other than would arise from purely local causes. The term "Bald" is a misnomer, since the greater portion of the top is a flat of the character of a sphagnous swamp, covered with a dense growth of moss and decaying fir trees. Mr. Hay also spoke of the character of the flora on Eel River and on Salmon River (Victoria County), portions of which he had visited, and on which several species of plants new to the Province had been discovered.

A valuable and instructive paper on the "Lower Forms of Plants and Animals" by Rev. Prof. Fowler of Queen's College, Kingston, was read at this meeting.

[NOTE.—The plants referred to above, together with those found by other botanists during the past season, new to the Province, will be found in the List of Plants appended to this issue of the Bulletin. They amount to twenty-six species. To these may be added the following list of mosses new to the Province, found chiefly on the Tobique, and identified by Prof. Macoun:]

1. Sphagnum intermedium, Hoffm. *Hay.*
2. Dicranum fulvum, Hooker. *Hay.*
3. Desmatodon cernuus, Bruch & Schimp. Restigouche, *Prof. Macoun.*
4. Bryum pendulum, Schimp. *Hay.*
5. B. uliginosum, Bruch & Schimp. *Hay.*
6. B. subrotundum, Brid. *Prof. Fowler.*
7. Tayloria splachnoides, Hook. *Hay.*
8. Splachnum ampullaceum, Linn. Rare. *Hay.*
9. Meesia longiseta, Hedw. Queens Co., *McKay.*
10. Polytrichum gracile, Menzies. *Hay.*
11. Cratoneurum filicinum, Linn. *Hay.*
12. Ctenidium molluscum, Hedw. *Hay.*

NOVEMBER 4TH.

This evening was devoted to the reading of papers presented by members of the Ornithological Committee. Mr. Alfred Morrissey described the Crows and their allies. The Raven is so much persecuted that it has become quite scarce in some parts of New Brunswick; the crows, however, are very numerous. The Canada Jay, another member of the Corvidæ, is very common about the lumber camps in winter time. Mr. F. W. Daniel descried the distribution and habits of the Cormorants. Two species of this family are found in New Brunswick, the "Common" and the "Double Crested," of which the latter is the more common. It is known at Grand Lake as the "Black Brant." Mr. Chamberlain gave an account of the migration of birds in New Brunswick. The great majority of birds make two migrations each year; those which go farthest north in summer go also farthest south in winter, and those which come earliest usually stay longest. They usually seek the same place to breed each year. Memory was an important factor in directing the migration of birds.

DECEMBER 2ND.

Mr. Matthew delivered an address explanatory of a paper by him on "Recent Discoveries in the St. John Group." This paper will be found on a preceding page.

JANUARY 20TH.

The President read his Annual Address on the "Ethics of Law," which is a part of this Bulletin.

REPORT OF THE COUNCIL OF THE NATURAL HISTORY SOCIETY OF NEW BRUNSWICK FOR 1884.

THE Council of the Natural History Society of New Brunswick beg leave to submit the following Report for the year ending January 20th, 1885:

MEMBERSHIP.

The Society has elected thirteen (13) Ordinary, three (3) Corresponding and six (6) Associate Members, making a total of 81 Ordinary, 48 Corresponding and 40 Associate Members.

MEETINGS.

During the year ten regular meetings were held, at which the following papers were read:

February 5th, 1884—G. F. Matthew, M. A., on Discoveries at a Village of the Stone Age at Bocabec.

March 4th—Wm. M. McLean, on the International Fisheries Exhibition.

April 1st—Fred W. Daniel, on Gulls; W. T. L. Reed, Lacustrine deposit at Fredericton.

May 6th—R Chalmers, Geology of Grand Falls.

June 3rd—L. C. Allison, M. D., Rhizopods.

September 2nd—W. F. Ganong, The Invertebrate Zoology of Passamaquoddy Bay.

October 7th—G. U. Hay, Botanical Notes on the Upper St. John; Prof. James Fowler, Some Differences between Animals and Plants.

November 4th—Alfred Morrissey, on Corvidæ; Fred W. Daniel, on Cormorants; M. Chamberlain, Migration of Birds.

December 2nd—G. F. Matthew, M. A., Fossils of the Cambrian Rocks at St. John.

January 6th, 1885—W. M. McLean, The Food Fishes of New Brunswick (postponed).

Besides the above there were five free lectures on Elementary Science, as follows:

February 19*th*—W. F. Best, The Atmosphere.

March 18*th* and 25*th*—W. F. Coleman, M. D., Anatomy and Physiology of Digestion.

April 15*th*—M. Chamberlain, Winter Birds.

May 20*th*—G. U. Hay, Fertilization of Plants.

December 16*th*—L. C. Allison, M. D., Public Hygiene.

COUNCIL MEETINGS.

The Council has met seventeen times for the despatch of business.

A Conversazione was held January 25th, and a Field Meeting in connection with the Eclectic Reading Club July 12th. Both were largely attended and successful.

The Treasurer reports that the total income of the Society for the year is $402.32, and the expenditure is $192.34, leaving a balance of $209.98[1] on hand January 16th, 1885.

The Curators report that a set of cases for insects has been obtained, and that the collection of insects of the vicinity of St. John made by Mr. Herbert E. Gould, and also those presented by Mr. Gibson Williamson and others, have been arranged and catalogued by Mrs. C. E. Heustis, so that they are now available for comparison and study. Important additions to the Museum in the department of Archæology have been made during the past year. Two of these are worthy of special mention. Dr. J. Baxter of Chatham has very generously presented to the Society a skeleton (probably of the early French period) exhumed at Tabusintac in Northumberland County, and with it remains of fur clothing, birch bark, and fragments of coarse cloth and cordage, all of which were found buried in three large iron-rimmed copper kettles at the mouth of the Tabusintac River. The other donation to the Museum in this department is the large collection of objects brought from Bocabec by the Summer Camp party of 1883. The greater part of these have been examined, classified and placed temporarily in one of the cases in the Geology Room. They consist of implements in stone, bone and ivory, fragments of pottery, bones of various animals used for food, shell-fish, etc. This collection will be useful to show the grade of culture attained in New Brunswick by the later people of the Stone Age. A set of cases for the geological collection is being made and will be ready in about a month. Besides these several new cases are necessary for the proper preservation, arrangement and exhibition of collections in the Museum, particularly the large herbarium of native and foreign plants, and the collection of birds' eggs and nests. It is also desirable to have the rooms of the Society open to the public on certain days in each week, so that the valuable collections in the Museum may be made useful to all who desire to study them, and the Curators recommend that a suitable person be employed to take charge of the rooms and keep them open as above suggested.

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[1] This amount has been appropriated for cases referred to in the Curators' Report.

LIBRARY.

The Librarian reports that there are now six hundred and fifty-seven bound volumes and pamphlets in the Library, sixty-four of which were added during the present year. A few of these were purchased, the rest donated.

BOTANY.

The Botanical Committee are able to report that a List of Plants, revised and enlarged, has been prepared under the direction of Prof. Fowler of Queen's University, with the assistance of the botanists of this Province. The List is published as one of the articles of this issue of the Bulletin. The work done since the first catalogue of plants was published has been considerable, the addition of species new to the Province quite large, and the range of rare plants greatly extended, as the subjoined list will show. The thanks of the Society are due to Prof. Fowler for the warm interest he has taken in the development of our Flora, and the self-imposed labors he has undertaken and so well accomplished.

Owing to delays which have arisen in procuring cases ordered last summer for the Geological collection, a considerable balance appears in the hands of the Treasurer to the credit of the Society this year, but an amount equal to this balance has been appropriated for the cases above referred to. The amount available for general purposes during the coming year will therefore depend upon the sums collectable for members' fees and the grant from the Provincial Government. The grant received last year from the Provincial Government was appropriated as follows:

Cases for the Museum, ...	$200 00
Towards publication of the Bulletin of 1884, ...	50 00

With the accession to the funds of the Society in consequence of the grant now given by the Government, it is the intention of the Council to carry out the suggestion of the Curators relative to the opening of the Museum to the public. As usual, a course of free lectures on Elementary Science will be delivered during the present winter, and, in addition, Mr. W. F. Best has obtained the use of the rooms for the purpose of instructing a class in Elementary Chemistry. This, too, will be free.

By means of the Essay and Lecture Course much useful knowledge has been disseminated. The various specimens in the Museum have proved useful to those engaged in the different studies as a means of identifying collections made by themselves, while the knowledge of our birds, plants, minerals, fish, etc., has been greatly increased and made readily available by means of Catalogues and the Bulletin published by the Society.

The Council would again tender their thanks to the daily press of the city for kindly inserting preliminary notices of meetings.

In concluding, the Council have to congratulate the Society on its progress in the past year, and express the hope that during the year upon which we have now entered the members and public will take a still deeper interest in the Society and the objects it promotes, both by personal attendance at its meetings and by collecting and donating to the Museum articles of scientific interest.

Respectfully submitted,

WM. J. WILSON,
Secretary to Council.

St. John, N. B., January 20th, 1884.

DONATIONS TO THE MUSEUM

DURING THE YEAR ENDED JANUARY 20TH, 1885.

DATE.	DONORS.	DONATIONS.
Feb.	MEMBERS OF SUMMER CAMP OF 1883,	Pottery, Implements of Bone and Ivory, Stone Weapons, Stone Implements, Stone Objects, Substances found in and around the Huts, Articles used for Food,—from Kitchen Middens at Bocabec River, Charlotte Co., N. B.
March.	ROBERT CHALMERS,	Glaciated Stone which has been broken and cemented after grooving,—from Grand Falls.
	HENRY SWIFT,	Fossils (Calamites, Lepidodendra and Sigillariæ)—from Spring Hill Mines, N. S.
April.	M. CHAMBERLAIN,	White-Winged Gull, mature and immature.
	F. W. DANIEL,	Ring-Billed Gull.
May.	CAPT. R. COLE,	Sea Shells from Nassau, Sea Fan, Coral (Oculina) from Bermuda.
	CAPT. S. GREARSON, of Bark "E. Nicholson,"	Pumice found floating in the Straits of Sunda after the eruption of Krakatoa.
	J. H. LEONARD,	Part of Stem of Indian Fig.
June.	GEO. K. SMITH,	Granite Pedestal from St. George.
	W. D. MATTHEW,	Nest of small bird, Darling's Island.
	M. CHAMBERLAIN,	Double Crested Cormorant, from Mace's Bay.
	HAZEN DRURY,	Fossil Moss (encrusted with lime), from the Rocky Mountains.
	HENRY GILBERT, JR.,	Flying Squirrel, from Rothesay.
	W. S. GILPIN, JOHN DALEY,	Loon, Brant, Gull and three Ducks, from Digby, N. S.
Sept.	WILSON DOBIN,	Loligo Bertramei, St. John harbor.
	J. C. ALLISON,	Stem of Calamite (?), from the Old Mine, Sydney, C. B.
	JOHN MCGOURTY,	Sandstone with concentric bands of color, from a clay bank, St. John.

DATE.	DONORS.	DONATIONS.
Sept.	W. I. WHITING,	Limestone with fossil shells, from Truro, N. S.
	W. J. WILSON,	Several Molluscs, Baie Verte and Cape Tormentine, N. B.; Stem of Calamite, Clones, N. B.
	G. U. HAY,	Gypsum with associated rock, Tobique River, N. B.
	Late GEO. THOMAS,	Wilson's Phallerope from Point Lepreaux, N. B.
	GEO. BARNHILL,	Whistling Swan, Belvedere Lake, St. John Co., N. B.
	W. F. GANONG,	Thirty-four species of Molluscs, Passamaquoddy Bay.
Nov.	MRS. S. WOODBURY,	Collection of Seaweeds (mounted), Martin's Head, N. B.
	NORMAN ROBERTSON,	Fossil Molluscs and Corals, Regina, N. W. T.; Anthracite, Cascade Mountain, Rocky Mts.; Fossil Tree, Medicine Hat, N. W. T.; Cones and Bark of Douglas Pine, Calgary, N. W. T.
	T. MURPHY,	Copper Ore (Chalcopyrite), Waterford, Kings Co., N. B.
	FRED. STOCKTON,	Barytes, Smith's Creek, King's Co., N. B.
	M. CHAMBERLAIN,	Young Loon, St. John.
	F. W. DANIEL,	Common Cormorant, Mace's Bay.
	PETER CAMPBELL,	Bird's Eyes (artificial).
	ALFRED MORRISSEY,	White-Bellied Nut-hatch, Belleisle Bay, N. B.; American Bittern, Little River, St. John Co., N. B.
Dec.	J. BAXTER, M.D.,	Three Copper Kettles, a Skeleton, portions of fur cap and moccasins, pieces of coarse cloth, birch bark and rope,—from Indian Point, Tabusintac River.
1885.		
Feb.	ALEX. MONRO, C.E.,	Implements of the Stone Age (axes, spear heads, etc.) Port Elgin, N. B.

DONATIONS TO THE LIBRARY.

DATE.	DONORS.	DONATIONS.
Feb.	HENRY WILMOT,	Report of Progress, Survey of Canada, for 1880-2, and Maps.
	BOSTON SOCIETY OF NAT. HIST.,	Proceedings, Vol. XXII., Part II.
	G. F. MATTHEW,	Illustrations of the Fauna of the St. John Group. No. I., Paradoxides.
	ACADEMY OF NAT. SCIENCE, Phila.,	Proceedings, Part II.
	BOSTON ZOOLOGICAL SOCIETY,	Quarterly Journal, Vol. III., No. I.
April.	OTTAWA NAT. FIELD CLUB,	Transactions, No. 4, 1882-3.
	ACADEMY NATURAL SCIENCES, Phila.,	Proceedings, Part III.
	BELFAST NATURALIST FIELD CLUB,	Annual Report, 1882-3.
	CAN. RECORD NAT'L HIST. AND GEOLOGY,	Vol. I., No. I., 1884.
	ROYAL SOCIETY OF CANADA,	Proceedings, Vol. I., 1882-3.
	UNITED STATES FISH COMMISSION,	Report 1880 (1883).
	U. S. GEOLOGICAL SURVEY,	Bulletin No. I.; Second Annual Report, 1880-81; Monograph No. 2; Atlas to accompany the Tertiary History of the Grand Cañon District.
	ESSEX INSTITUTE,	Three Pamphlets.
May.	CANADIAN INSTITUTE Toronto,	Proceedings, Vol. II., No. II.
	NEW YORK METROPOLITAN MUSEUM,	Fourteenth Annual Report.
June.	NAT. HIST. SOCIETY, Toronto,	Label List of Insects of Canada; Check List of Insects of Canada.
	N. S. INSTITUTE OF NAT. SCIENCE.	Proceedings, Vol. VI., Part I.

DATE.	DONORS.	DONATIONS.
June.	EDITOR,	Canadian Science Monthly, 1884, No. 3.
	BOSTON SOCIETY OF NAT. HIST.,	Proceedings, Vol. XXII., Part III.
Sept.	ESSEX INSTITUTE,	Bulletin Nos. 1, 2, 3, 4, 5 and 6 of 1883; Nos. 1, 2 and 3 of 1884.
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Oct.	LINNEAN SOCIETY OF NEW YORK,	Transactions, Vol. II.
	E. GILPIN,	Quarterly Journal of Geological Society, London, Vol. XI., Parts II. and III.
	SMITHSONIAN INSTITUTION,	Report 1882.
	U. S. GEOLOGICAL SURVEY,	Mineral Resources of the United States.
Nov.	CANADIAN RECORD OF SCIENCE,	Vol. I., No. 2.
	G. F. MATTHEW,	Pamphlets on the Cambrian formation of Wales.
	COLORADO SCIENTIFIC SOCIETY,	Artesian Wells of Denver, Col.
	CANADIAN INSTITUTE	Proceedings, Vol. II., No. 2.
	CLIFFORD RICHARDSON.	Composition of American Wheat and Corn.
1885 Jan.	BOSTON SOCIETY OF NAT. HIST.,	Proceedings, Vol. XXII., Part IV.
	ACADEMY NATURAL SCIENCE, Minnesota,	Bulletin, 1883.

ACT OF INCORPORATION.

EXTRACTS FROM ACTS OF THE GENERAL ASSEMBLY OF HER MAJESTY'S PROVINCE OF NEW BRUNSWICK.

CAP. XXIX.

AN ACT TO INCORPORATE THE NATURAL HISTORY SOCIETY OF NEW BRUNSWICK.

Sec.
1. Society incorporated.
2. Society may hold real estate ; amount.
3. Society may make by-laws, etc.

Passed 3*rd May*, 1883.

BE it enacted by the Lieutenant Governor, Legislative Council, and Assembly, as follows:

1. That LeBaron Botsford, M.D., George F. Matthew, George U. Hay, James A. Estey, Lucius C. Allison, M.D., G. Ernest Fairweather, William J. Wilson, Robert Chalmers, Montague Chamberlain, Harold Gilbert, W. F. Coleman, M.D., R. Peniston Starr and William F. Best, their associates, successors, and assigns, be and they are hereby created and declared to be a body politic and corporate, by the name of "The Natural History Society of New Brunswick," and by that name shall have all the general powers and privileges made incident to a Corporation by Act of Assembly in this Province, or otherwise, for the purpose of promoting the study of Physical Sciences, the forming a General and Provincial Museum, and Scientific Library, and facilitating generally the acquisition and dissemination of useful knowledge.

2. The said Corporation shall have power and authority to take and hold real and personal property for the purposes of this Act, provided that the value of the real estate held by said Society shall not exceed the sum of fifty thousand dollars, and may sue and be sued in its corporate name in any Court of law or equity, or otherwise howsoever.

3. The said Corporation shall also have power and authority from time to time to enact and pass such by-laws not contrary to law as it may deem necessary and desirable for its management and control.

OFFICERS OF THE SOCIETY

FOR 1885.

Patron: His Honor the Lieutenant Governor.

President: LeB. Botsford, M.D.

Vice Presidents: M. Chamberlain, James A. Estey.

Treasurer: Alfred Seely.

Corresponding Secretary: George U. Hay.

Recording Secretary: W. J. Wilson.

Librarian: S. W. Kain.

Curators: G. F. Matthew, F. W. Daniel, W. F. Best.

Members of Council: W. S. Harding, M.D., E. Fisher, L. C. Allison, M.D.

STANDING COMMITTEES

FOR 1885.

Physics and Chemistry: W. F. Best, G. U. Hay.
Meteorology: Gilbert Murdoch.
Mineralogy: W. F. Best, R. P. Starr, W. J. Wilson.
Geology: G. F. Matthew, R. Chalmers, W. J. Wilson.
Botany: G. U. Hay, J. E. Wetmore, J. Brittain, W. T. L. Reed.
Entomology: M. Chamberlain, G. Williamson, H. E. Goold.
Invertebrates: L. C. Allison, P. R. Inches, M.D., W. F. Ganong.
Vertebrates: LeB. Botsford, M.D., M. Chamberlain, W. M. McLean.
Ornithology: M. Chamberlain, J. W. Banks, A. Morrissey.
Library: S. W. Kain, W. J. Wilson, G. E. Keator.
Essays and Lectures: G. F. Matthew, G. U. Hay, C. H. Masters, LeB. Botsford, M.D., L. C. Allison, M.D., J. A. Estey.
Publication: M. Chamberlain, G. F. Matthew, G. U. Hay.
Hall: W. J. Wilson, S. W. Kain, G. F. Matthew.
Finance: A. Seely, W. J. Wilson, Edwin Fisher.
Press: J. A. Estey, W. F. Best, S. W. Kain.
Delegate to the Royal Society of Canada: M. Chamberlain.
Alternative: F. W. Daniel.

NEW MEMBERS ELECTED DURING THE YEAR

ENDED 20TH JANUARY, 1885.

ORDINARY MEMBERS.

February, 1884—Wm. Breeze, Rev. Dr. Pope, Alfred Seely.

March, 1884—Rev. Dr. Hopper, John H. Kinnear.

April, 1884—James W. Manson, Merchant.

June, 1884—W. Shives Fisher, Merchant.

September, 1884—James A. MacIntire (Portland).

October, 1884—Rev. W. Hancock (Rothesay), Rev. W. O. Raymond, Charles W. Hall.

November, 1884—Rev. G. O. Dobbs.

January, 1885—J. W. Holly (Portland).

CORRESPONDING MEMBERS.

May, 1884—Rev. E. C. Sanders, St. Stephen, N. B.

September, 1884—Alex. Monro, C.E., Port Elgin, N. B.

October, 1884—Fred W. Watson, Teacher, Harvey, Albert Co., N. B.

ASSOCIATE MEMBERS.

February, 1884—Miss C. Martin.

April, 1884—Mrs. Thomas MacLellan, Mrs. W. F. Best, Mrs. Wm. Shives.

December, 1884—Miss Janie Rowan.

January, 1885—Miss Nellie Robinson.

BULLETIN
OF THE
NATURAL HISTORY SOCIETY
OF
NEW BRUNSWICK.

No. V.

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J. & A. McMILLAN, 98 PRINCE WILLIAM STREET.
1886.

BULLETIN

OF THE

NATURAL HISTORY SOCIETY OF NEW BRUNSWICK.

No. V.

SOME THOUGHTS ON SOCIAL SCIENCE.

NOT long since two children were talking about the death of a little companion. One was overheard to say, "It was owing to the drain." In ascribing the death to a cause, the child was following an instinct which has always and universally prevailed in the race. It does not matter whether it is among the young or the old, among barbarous or civilized communities, wherever there is intelligence, this exercise of the mind, this necessity to ascribe every event to some antecedent, is displayed. It is not necessary to scrutinize from whence the faculty came, nor *how* it may have been developed. It is an universal and indisputable fact. I would not confine its action to the human mind, for I think it evident that the same principle is in operation among the lower animals. This conviction that every effect must proceed from a cause is the basis of all desire to enter upon philosophical investigations, and without it our every day life and work would be aimless and meaningless. In the case of the children alluded to above it was indicative—not merely of a natural faculty being exercised — but was a proof that the faculty was exercised in connection with a science which of late years has occupied the attention of thinking minds; and further, that the knowledge of principles which affect men in their social relationship was making its way even to the youngest members of society.

Though Social Science is of late growth, it is assuming large proportions. Some of the most important Philosophical gatherings take place in connection with it, and are assuming, not merely national, but world-wide notoriety. This Science has to deal with all the conditions under which man acts upon man, and in which the *human will* shews itself a most important factor. In fact, it derives its name — Social — because it treats of the relation and dependence of each member to the whole of the community.

In other departments Science has to do with Physical elements, and the laws or forces which regulate their action. It is purely objective, inasmuch as it deals with matter which under similar conditions necessarily manifests similar results, whether it be the chemical relations of atoms — the physiology of the organs of life — the evolving geological phenomena — or the study of the vast universe, with its host of stars. All of these can be looked at as outside or independent of man himself; whereas, Social Science, whilst it may be closely connected with each and all these conditions or phenomena, has also to investigate the complicated conditions which result from life and are modified by the mind of man and its Protean changes.

It is not very long since the true method of investigating material phenomena has been followed, and it has wondrously progressed, yet there are labyrinthine intricacies still to unravel. But though the difficulties attending the relation of atom to atom are very great, they are infinitely outnumbered when they have added to them the uncertainties which necessarily attend the subtle combinations of the human mind. These combinations follow the action of the will, or controlling principle; and the *will* to act is called into play and determined by the surrounding circumstances; every faculty becomes more or less a factor in the ideas suggested, and every factor differs in its relative power in different persons, also in the same person at different times. Now, as the inductive system has to be followed in Social Science, as in that pertaining to Physics, we can form some slight idea of the difficulties which attend all investigations in subjects where the variable and disturbing elements form so large a portion of the data to be considered. We now readily admit that it is not wise to first adopt principles, and then endeavor to make facts conform to them. Such a method would prove destructive to progress in Physical Science, and cannot prove beneficial in that science which will some day regulate our social condition. Principles of action not first based upon a series of observations, will mislead rather than advance true knowledge. Progress in Social Science must necessarily be slow, though the wisest of men bring their experience to the yearly meetings of Scientists devoted to that study. Now and then genius in the Physical department may leap to conclusions; but even then these conclusions require to be verified by long and accurate investigation of details before they can be accepted as correct, and as in accordance with a constant force power.

One branch of Social Science deals with man and his relation to the physical conditions around him. Under this head that which is called Hygiene may be treated. Our dwellings and their construction — their aggregation — their ventilation and drainage so as to get rid in a safe way of all the effete matters and exhalations which are poisonous to the living organism. These matters may appear very simple and of such a character that there could be no difficulty in determining what was best to be done, and yet, simple as they may appear, there is much difference of opinion respecting them, very much ignorance, still more dogmatism; and it will require much observation before anything can be determined so that municipal or national power can be made available for their regulation.

At the present time the size of drains is a disputed point. It might be supposed that such a material question should long since have been settled, and yet every Sanitary Engineer follows his own ideas, and not one established by a truly inductive method. It may be said that the size of drains in any place must depend upon the number of inhabitants and the grades of the locality. This admits the difficulty, and shows that in complicated circumstances a large amount of accurate observation must be made before any dogmatic rules can be approximated. The disposal of sewage is still a vexed question, and an enormous waste of useful material occurs for want of knowledge or from neglect of method, or from both causes.

Ventilation of buildings has had a good deal of attention given to it, and in some points is well understood. The quantity of air required for a certain period — the amount of deterioration, the injurious products continually being thrown off — the high rate of mortality where the space occupied has been too small, and the supply of fresh air too limited. All these points are tolerably well ascertained; yet how to accomplish a perfect system of ventilation is far from being settled, and more or less injury attends not merely assemblies of people, in places of amusement and in our schools — but in our ordinary houses. One example of the many errors which still pervade society may be mentioned. Knowing that the carbonic acid gas formed in respiration was heavier than the atmosphere, some hygienists have insisted that the openings for ventilating a room should be at or near the floor — overlooking the law of the diffusion of gases, which causes the heavier and lighter gases to speedily mix, and that this warm mixed gas tends to ascend in the same way as common air. If progress is slow in these matters where man comes into contact with physical elements, how much greater must be the difficulties when we enter upon those questions which are associated with moral principles, and which deal with the criminal acts of the community. When men disregard physical laws there is a result more or less direct, and it may be personally experienced. These laws involve the consideration of matter in its different conditions, and as manifested by palpable effects. Compared with them the moral laws are more hidden, harder to unravel, and the factors much more subtle and uncertain. There are certain offences which are generally admitted to be such, and are at once condemned. Some of these are against the person, some against the community, some against the nation, some against the race — all these involve life and property and liberty. They are so palpable that men legislate for their suppression without any hesitation, yet there are acts which have all the conditions of crime which we justify, because they pass the border land of common rights — such, for example, as the destruction of an opponent in self defence.

We would naturally suppose that the punishment of crime would be a question easily solved. Yet here Social Science is merely beginning its work. Is the punishment of crime to be retributive, repressive, or reformatory; or, are all three of these principles to be recognized? Opinions upon this subject are vague and unformed; in fact, as varied as the human mind varies in its constitution. The treatment of offenders is not the only subject in this connection in which confusion prevails. The very construction of prisons is a matter of debate. Then again arises the question: How can we deal with the exceptions which are caused by individual peculiarities? It may be said that we must be content with general laws. This, however, would admit that conditions exist to which the inductive system cannot be applied. But this, in fact, would be asserting that law ceases to reign, or that there is a point in Philosophical investigations beyond which the infirmity of man cannot pass.

There is one branch in which perhaps more accuracy has been attained than in any other social relationship—that is, life assurance. It has been and is based upon numerous observations, from which certain results have been determined. Given a number of lives at any age—and the probabilities of the time of the death of all have been so established that Insurance companies are able, with but little risk, to adapt their table of rates to ensure a fair profit from their policies. This is in reality the result of an inductive method, yet evidently superficial as regards the causes of death, and not founded upon a knowledge of the complicated condition of life. The relative longevity of different classes of society has been somewhat ascertained by the same means.

Social Science is further complicated with questions which differ in degree from those above alluded to, and add to the uncertainty necessarily connected with motives where self interest may be an inducement to action; principles which constitute political economy and affect the relationships of society.

A late review (the *Edinburg*) gives a list of several subjects which compose the creed of one section of the aspirants for political power; among them are the following:

(*a*) Abolition of the House of Lords
(*b*) Home Rule for England, Ireland, and Scotland.
(*c*) Abolition of Parliamentary Oaths.
(*d*) Graduated Income Tax.
(*e*) Radical Reform of Land Laws.
(*f*) Extinction of City Companies.
(*g*) Local Option.
(*h*) Elementary Education, free and non-sectarian.
(*i*) No further extension of Empire by war or otherwise.
(*k*) Triennial Parliamentary Elections.
(*l*) Taxation of Ground Landlords.

All these questions and many more of a similar character indirectly affect the social well-being of society, and as such partake to a certain extent of the nature of Social Science. It may be that long experience points to these as more or less correct in principle — that they are in unison with the instinctive impulses of a people; yet who cannot but see at a glance that they are demands more or less absolute, and whether they be correct or not can only be decided by extensive experience over long periods of time. To call them political economy or Social Science is to assert that they are conditions agreeable to or based on law!! That the philosophical method, (namely, that of induction) is as necessary for their establishment as it is for that of either physical or social relations, and that to assume them to be correct is to violate the principle which we use in the attainment of all our knowledge. There may be instances where the *instinct* of the many may be more correct than the reasoning of the few. There are certain propositions which the human mind accepts without questioning, such as the Divine command, "Do unto others as you would they should do unto you," a corollary of which is "all men are born to equal rights;" yet to carry out the working of such instincts or propositions requires a knowledge of many details — an immense amount of experience — a philosophical arrangement which must be inductive in character.

In the movements of society I would regard instinct and reason as complemental. One may be more correct in its work than the other, taken singly, but the greatest amount of truth will probably follow when both operate in the same direction.

We are so constituted, mentally and morally, that the physical, social, political and moral relationship shall move along contemporaneously, though by no means with equal velocities. We are conscious, from what has been determined, that law, or order, or governing principles, prevail in the movements and changing conditions of material substances. We feel assured that law prevails in the more ethereal department of being, ramifying through all the relationship of life. We would also claim that as material facts form the basis of physical laws and true philosophy, so also must the principles which are rightly to regulate the social-political well-being of man be *inductively* derived from properly arranged data, rather than the guesses of the most gifted of the race — that laws undoubtedly must follow from the observance of sequences in both cases — that whilst "fools rush in where angels fear to tread," and pronounce dogmatically on the most abstract questions, the truly wise will calmly learn by testing and weighing, until the false is eliminated and the true established, and law reigns throughout the domain of existence. It has always been the case — and, perhaps, is as much so as ever it was — that the greater the amount of ignorance the more decidedly will a panacea be maintained which shall efface all the evils which afflict the world; and we feel assured that so long as ignorance exists, so long will nostrums be urged even in physics, but more especially in hygiene and in social problems, and most undoubtedly in political economics.

ARTICLE I.

DESCRIPTION OF A NEWLY-BORN LYNX.

Lynx Canadensis (DESM.) RAF.

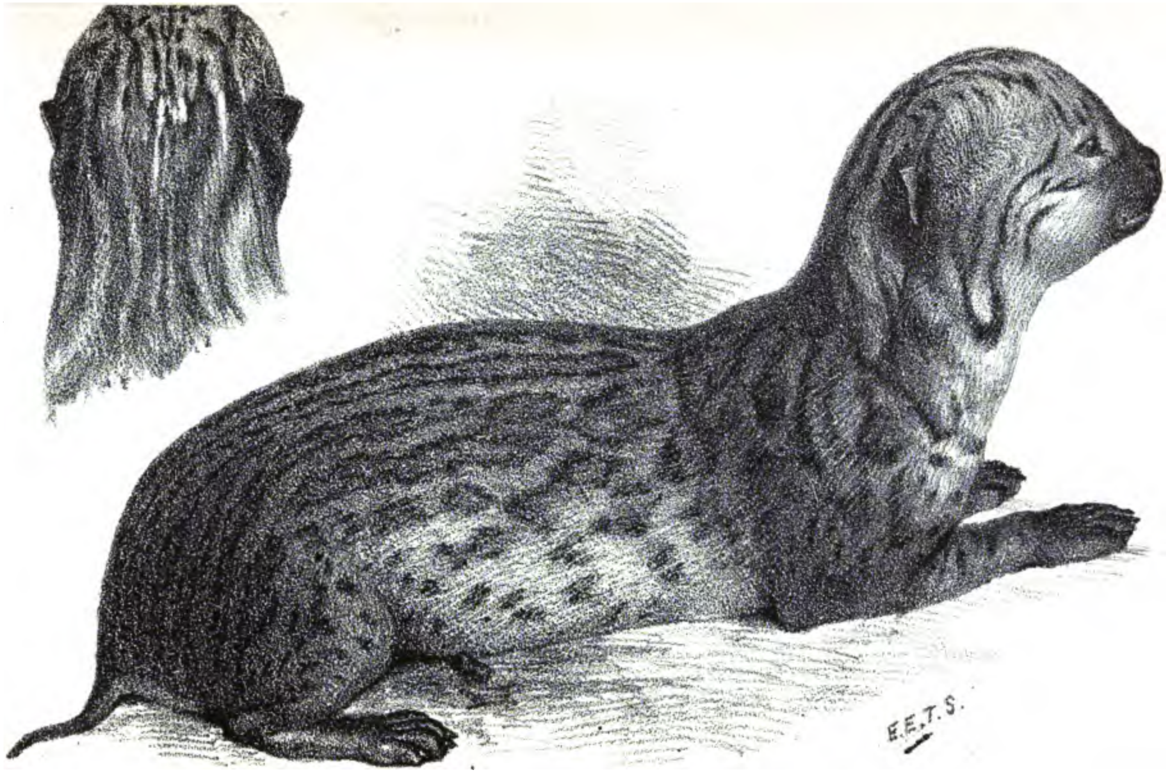
BY DR. C. HART MERRIAM.

(READ 2ND FEBRUARY, 1886.)

MR. MONTAGUE CHAMBERLAIN, of St. John, New Brunswick, has kindly sent me for examination and description, a mounted specimen of the newly-born young of the Canada Lynx. "It was dropped," writes Mr. Chamberlain, "on the 20th March, 1883, when the mother had been in captivity about a month. She gave birth to five (5) kittens, but this was the only one rescued from her unmotherly jaws. When the first was born she at once prepared to clean it, and seemed fond of it. After a short time, however, it gave vent to a weak squeal, which caused her to eye it curiously for a moment, when another squeal was delivered. This settled the kitten's doom—it was at once devoured. The mother did not exhibit any tenderness towards the other four, and the keeper made two unsuccessful efforts before he was able to get one away from her. This kitten lived two days, and then died from injuries received in its removal from the cage. Its 'mew' was something like that of a domestic kitten, but stronger and harsher; it was almost fierce and very penetrating. The general strength of the animal was greater than that of a domestic kitten. Two hours after birth it stood firmly on its feet and turned around in its box, but it did not show any inclination to fight when teased. The eyes were open at birth."

It is but a trifle larger than the young of the domestic cat at birth, and may have been born a little prematurely, though the fact that its eyes were open argues against this supposition. I am unable to give many measurements of value, since I did not see the specimen till after it came from the taxidermist.

DIAGNOSIS.—Above, brown, paler below; back and sides with longitudinal stripes and blotches of dark sub-rufous brown; belly



NEWLY-BORN YOUNG OF THE CANADA LYNX, (Lynx canadensis,)
NATURAL SIZE.

with a few small brown spots; cheeks brownish-gray; each side of the neck with a long vertical spot of grayish-brown, distinctly margined with brownish-black.

DESCRIPTION.—Size a trifle larger than that of the newly-born young of the domestic cat. Body slender. Head very round. Tail 22mm. (.85 in.) in length. Ears imperforate, the only visible portion consisting of a very thin, sub-triangular, hairless fold of integument, with a nearly vertical base 13mm. (.52 in.) long. The greatest height of the auricle is 4.50 mm. (.18 in.)

The entire upper parts and sides of the animal are well covered with hair, but the under parts are sparsely covered, and the inner aspects of all the legs are entirely naked. The throat is so thinly haired that in some places the veins in the skin are distinctly visible, and there is a bare patch surrounding the ear.

COLOR AND MARKINGS.—The ground-color of the body is light fawn, paler below, and inclining to buff on the sides. It is much obscured above by the stripes and rows of concatenating brown blotches, and below by small dark stripes.

The triangular area of the face included between the nose and eyes is of a uniform brown, without markings. The rest of the head is ash-brown, becoming light fawn-colored on the centre of the crown and over the occipital region, whence the same color extends over the whole back of the neck. The top of the head is ornamented with a number of fine dark spots and lines that extend over the occiput. Between the eye and ear, on each side, is a large oval spot of brownish ash, without markings. On each side of the throat, a little below the angle of the jaw, is a rather indistinct patch of soiled white—which color occurs nowhere else on the animal.

The cheeks, just under the eyes, are marked with a few dark lines. From just behind the outer angle of the eye two streaks of very dark brown extend downward, curving gently toward the throat, diverging slightly as they proceed, the posterior continuous, the anterior once interrupted, and then, turning abruptly, they meet on the side of the neck about an inch (25 mm.) below the eye, enclosing a light stripe which at the bottom (the widest part) measures 2.75 mm. (.10 in.) in breadth. This constitutes the most conspicuous marking on the animal. There is a short line behind this, opposite the ear, and another in front of it, which latter slopes toward, but does not reach, the anterior border of the eye. There is, on each side of the head, behind, a stripe that extends from the crown almost to the shoulders. It curves in such a way as to present an outward convexity opposite the ear, and an outward concavity below it. It is dark brown above, inclining to rufous-brown below. It is sub-continuous anteriorly, with an interrupted line that runs forward over the side of the head, almost reaching the eye. The middle region of the head and neck, behind, is occupied by a broad sub-rufous-brown band, extending from above the level of the ears to the shoulders, and varying in width to adapt itself to the space between the two curved lines just described. Anteriorly it is ornamented with half a dozen more or less interrupted dark lines, which extend back to a point opposite the middle of the ears. These markings combine to produce a very symmetrical and handsome lyre, which reaches from the crown of the head to the base of the neck behind. (See plate.)

A little below the middle of the throat, in front, is an almost continuous brown collar, and below it still are indications of two others.

Sloping downwards and backwards from the base of the neck, over the shoulders, are three or four elongated blotches of different sizes. The fore legs appear to be of an almost uniform brown, with faint indications of spots, but are so sparsely haired that it is impossibie to define the markings.

A line of concatenating blotches of very dark brown extends down the middle of the back, commencing just behind the shoulders. These blotches decrease in breadth posteriorly till they become lost in a narrow and very dark interrupted stripe, which extends out upon the tail. On each side, over the flanks, are four broader longitudinal bands, or rows of more or less confluent blotches, of sub-rufous brown, narrowly and somewhat irregularly bordered on each side by an interrupted line of dark brown. The second and third of these stripes run together anteriorly, so that the second is in reality dichotomous.

The three uppermost stripes are continuous, the fact that they are made up of confluent blotches becoming apparent only after a critical examination of their dark borders; but in the lower line the blotches are distinct, the pale fawn color of the sides appearing between them. The belly is strewn with a number of small dark spots. The stripes of the back and sides become obscure in passing over the hips, their dark borders alone remaining distinct, so that the hind quarters present the appearance of an almost uniform reddish brown surface streaked with narrow interrupted lines of very dark brown.

Anteriorly, the lateral bands originate in the median line, and the lowermost springs from between the shoulders, passing obliquely backwards immediately behind the post-scapular fold. Its narrow upper border, meeting its fellow of the opposite side, makes a dark V-shaped mark over the shoulders.

It is hardly necessary to call attention to the fact that this specimen is one of unusual interest, since its very decided markings, of which scarcely a trace remains in the adult animal, cast some light upon the genetic affinities of the genus to which it pertains. A critical study of these markings leads to the interesting conclusion that the genus *Lynx* was derived from the group of cats of which the Ocelot (*Felis pardalis*) is the nearest living representative.

ARTICLE II.

ON PRE-HISTORIC REMAINS, AND ON AN INTERMENT OF THE EARLY FRENCH PERIOD, AT TABUSINTAC RIVER, N. B.*

ABOUT three years ago Dr. A. C. Smith, of Newcastle, Miramichi, communicated to this Society information in relation to some pre-historic remains recently discovered at the mouth of the Tabusintac River. Since Dr. Smith's letters were written, Dr. J. Baxter, of Chatham, who obtained the relics of the early French period described by Dr. Smith, has very generously placed them in the Museum of this Society; and the information obtained from Dr. Smith and others, relative to the remains of the Stone and French periods at Tabusintac, is herewith presented.

The Tabusintac River is a small stream flowing through a flat country, and entering the Gulf of St. Lawrence at the north side of Miramichi Bay. The localities referred to in Dr. Smith's letters, as will be seen by reference to the sketch map accompanying this notice, are at the mouth of the stream, partly on the low shores of Tabusintac lagoon and partly within the entrance of the Tabusintac River. The remains of the stone period were found in the bank at the extreme point of land on the north side of the river; the crucifix on the shore outside the point to the North, and the remains buried with the copper kettles inside the point, at the side of a cove.

[*Extracts from a letter of* JOHN CAMPBELL (*Tabusintac, 3rd Nov., 1879*) to Dr. A. C. SMITH.)

"*Dear Sir,*—I wish to acquaint you with a discovery made on Fri-
"day last by my brother Norman. He had gone down to Indian Point,
"at the mouth of the river, to note the effects of the late severe storm,
"and on his return noticed that the sea had washed away the bank in
"several places. Near the spot where I found the arrow-head I gave you,
"he observed something having a metallic appearance. On removing
"the earth it proved to be a copper boiler, 18 inches across the mouth

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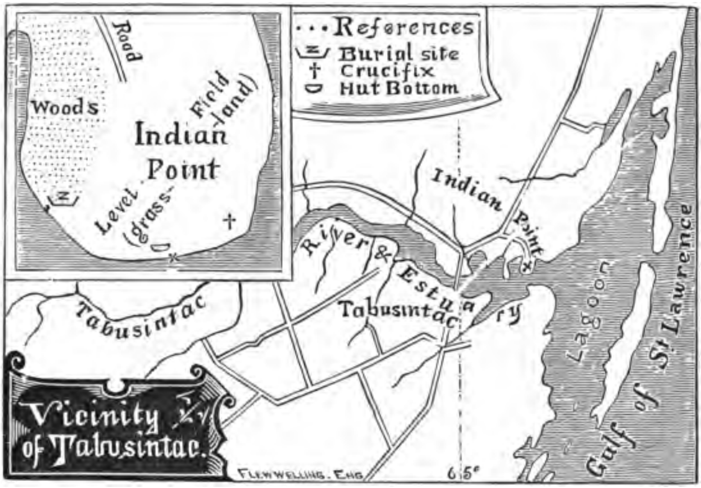
* The following extracts of letters and comments thereon have been prepared by a Committee of the Natural History Society to which these relics were referred.



"and 11 inches in depth; and two more beneath that one, about twice "the size of the upper one. They were all bottom up. On turning up "the lower boilers they found human bones and a mass of a dark color. "The uppermost boiler, the smallest, is in a fair state of preservation, except an iron band around the upper part, which is nearly consumed "with rust; the other two are useless as boilers. The two large boilers "appear not to have been in use, as they are quite bright and appear "new, while the smaller one is black on the outside; this, the upper "one, was two feet below the surface, and must have been a long time "buried, as a tree of considerable size had grown above it."

Extracts from Letters of DR. A. C. SMITH, *Newcastle, 29th Dec., 1882, 4th and 10th Jan., 1883, and 27th July, 1884.*

"*Dear Sir,*—I wrote to you concerning human remains found underneath copper kettles in Tabusintac. I visited the spot this Fall, and "found that the 'remains' and kettles had been removed to Chatham.* "A pine tree about nine inches in diameter had grown over the spot. "The place is said to have been the site of an Indian encampment "during 'untold ages.' A river flows past the grounds. I dug away the "earth from the edge of the bank in front of the ground, which had at "one time been under cultivation. At about 18 inches below the surface "I struck what my guide called '*the workshop*'; there was first about "three inches of loam, then about fifteen inches of gravel (or, to speak "more correctly, small stones mixed with earth or clay), then *ashes*. In

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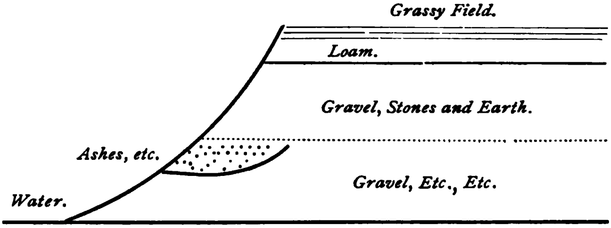
* They have since then been presented to the Society by DR. J. BAXTER, of Chatham. See donations to the Museum, Dec., 1884, in Bulletin No. IV.

"the ashes I found several stones which had been *burnt*, also an arrow-"head, and several pieces of stone of the same material as the arrow-"head. It seemed that the ashes were in a pit,* and did not form an "extended layer along the bank. The lower part of the bank, including "the ash-bed, had a thickness of about 18 inches, and beneath the ashes "consisted of gravel, etc., etc. In the layer of loam, a short distance "from the 'workshop,' I found a leaden cross.

"The accompanying diagram will exhibit the relations of the "several layers in the bank."



"The site of the old encampment (marked by the grassy field) is "very flat, and about four acres in extent, and the country is level for "many miles to the north and east. Behind the camp-site is the forest, "and on each side and in front, water. The copper kettles were found "(at the place marked _Z_/ in the plan) at the rear of the camp-site. "Arrow-heads have been plowed up in different parts of this flat."

It is unusual in this Province to discover, at one locality, objects of interest showing an occupation of the country at periods so widely distant in time as these remains indicate, and this is sufficient cause for a more extended notice.

The leaden crucifix was found in the surface loam at a depth of three inches, where it might have been buried by the plough. In order to obtain further information in reference to this object Geo. Stewart, Jr., Esq., of Quebec, a corresponding member of the Natural History Society, was consulted, and he wrote in reply to the following effect:

"Rev. Abbé Laflamme, of Laval University, says that the leaden "crucifix was evidently given by the early Roman Catholic missionaries "to the Indians they were sent to evangelize. One of the Abbé's con-"freres in the Seminary has in his possession a leaden crucifix which is "absolutely of the same design. It was given to him as a souvenir of a "certain mission to which he was at one time attached. The inscription

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* For ashes apparently accumulated in pits, see description and figure of ancient hut-bottoms at Bocabec, Bulletin No. III.

" 'I. H.,' if complete, would be I. H. S., and is to be found on several cruci-
" fixes. Dr. Laflamme is of the opinion that the cross was at one time
" attached to a chaplet of beads, and later separated from it."

The information supplied by Abbé Laflamme is in accord with what is known of the History of Acadia during the French period, and we probably have in these relics evidences of the early contact of the French with the aborigines in this part of America, perhaps contemporary with the first attempts to colonize in the St. Lawrence Valley and the Bay of Fundy.

The ruder remains found in the bank at the extremity of Indian Point are of even greater interest, as proof of the earliest occupation by man yet recorded in this part of America.

At many points along the coast of New Brunswick, both on the beaches of the Bay of Fundy and the low shores of the Gulf of St. Lawrence, abundant indications are to be found of the presence of man prior to the advent of Europeans; but in all cases, camping sites and proof of human occupancy are strictly connected with the present surface of the ground, and are not buried beneath quaternary deposits, such as are stated to cover the hut-bottom explored by Dr. Smith at Tabusintac. The separation of these remains from those of the historic period by a bed of small stones, earth, and clay, of fifteen inches in thickness is a remarkable condition of entombment for this region; but its significance can scarcely be appreciated unless we recall the closing events of the post-tertiary time in this part of America.

From New Jersey to Prince Edward Island, along the eastern coast of America, indications are to be met with of a slow but steady subsidence of the land. This movement appears to have been as rapid here, or nearly so, as farther west. The buried forests in the marshes of the Annapolis Valley, and in Minas and Cumberland Basins, attest it, as well as sunken peat bogs in the coves along the northern shore of the Bay of Fundy. But the actual sinking at present in progress on the south-western shore of the Gulf of St. Lawrence, is more clearly seen in the peat bogs now being broken up at the mouth of the Miramichi River,* and submerged groves of white birch observed at Richmond Bay, on the east side of Prince Edward Island, by a late Vice-President of this Society.*

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* *Vide* Gesner, Reports on the Geology of New Brunswick.

The very fact of the unearthing at Tabusintac, by the encroachment of the sea, of the remains both of a prehistoric people, and also of those of the present race of aborigines, are additional proofs of the continued downward movement of this part of the continent. There is not a bay or river mouth along this shallow coast, from Shippegan to Pictou, except where the coast is unusually bold, which is not guarded by a range of sandy Islets, thrown up by the surf on this subsiding coast. This downward movement favours the formation of "lagoons" or shallow bays behind these beaches, and gives rise to the peculiarities of the coast at Tabusintac.

All this, however, goes to show that the preceding deposit at Indian Point, which is possibly an older beach, belongs to an earlier period in the history of geological changes than the existing barrier islets, for it indicates an occupancy of the land when near its present height above the sea. To admit of the covering of the old hut-bottom at this place by alluvial beds, the land must have sunk below the sea subsequently, so that the rude occupants of this and other huts were driven to the higher land, while the sea and river piled up the accumulated deposit which is spread out over the flat area of Indian Point.

The surface features along this part of the coast are not opposed to the existance of an old beach line along here, crossing the mouth of the Tabusintac River, as may be seen by reference to the accompanying plan of the district. A small pond near the shore of the main land, at the northern end of Tabusintac Lagoon, is connected by swales with the estuary of the Tabusintac within Indian Point, and these correspond to an indentation on the southern side of the Tabusintac estuary.

Subsequently to the formation of this flat the land was elevated so as to throw back the coast line outside of the line of sandy islands which now shelter Tabusintac lagoon, and after this the period of subsidence now in progress began.

We have no evidence that there has been any arrest in modern times to the subsidence now going on in the Bay of Fundy area ; at least none of sufficient importance to impress itself on the marine marsh and river estuarine deposits that have accumulated in the indentations of this Bay. Yet these deposits have a depth at the head of the Bay of Fundy of twenty or thirty feet, as may be seen from the article on Chignecto Isthmus published in this Bulletin.

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* The late M. H. PERLEY.

As on the Gulf of St. Lawrence, so on the Bay of Fundy; the period of subsidence was preceded by one of elevation. The elevatory movement differed from that of subsidence which followed, in that the upward motion of the coast line was spasmodic, and produced terraces both along the coast and in the valleys of the interior; the lowest of these flats is known as the fifteen feet terrace, and may possibly be contemporaneous with the beach line at Tabusintac, which has entombed the hut-bottom of the stone age at Indian Point. However that may be, an indication favouring the early presence of man in New Brunswick is the occurrence of charcoal buried in the shallow lacustrine deposit of the Southern Basin of Torryburn valley, mentioned in Bulletin No. II of this Society, page 18; this charcoal has the same relation to the terraces between 15 and 50 feet on the Bay of Fundy that the hut-bottom at Tabusintac has to the old and now elevated flat of land (beach?) of which Indian Point may be considered a remnant. The charcoal may have been produced by natural causes, but the hut-bottom at Tabusintac is an undoubted indication of early human occupancy of this region.

The arrow-head which Dr. Smith found among the ashes of the hut-bottom is symmetrical and well finished; it is of lance-oval form with a square base; the arrow-head is very neatly chipped, and has a slight twist or " wind," a not unusual feature in the arrow-heads from the Bocabec locality (Bulletin No. III). This arrow-head could not be distinguished from those used by the present aborigines, before contact with European civilization.

It is to be regretted that so little in the form of weapons or tools belonging to the older race which inhabited the northern shores of New Brunswick should have yet been found, but it can scarcely be doubted that a zealous search would yield results which, if not equal in interest to those obtained by Dr. Abbott in the valley of the Delaware, would at least give us a better knowledge than we now possess of these early autochthones.

ARTICLE III.

ON THE PHYSICAL FEATURES AND GEOLOGY OF CHIGNECTO ISTHMUS.

BY ALEX. MONRO, C. E.

(READ FEB. 3, 1885.)

THERE are but few places in the Maritime Provinces where nature and history combine so many points of interest as exist on the Isthmus between Nova Scotia and New Brunswick. The great rise and fall of tides in Cumberland Basin, submerged forests, and sea dikes, are subjects of much interest; and both nature and history point to this Isthmus as the chief highway occupied by the men of the *stone age* in their migrations from one side of the country to the other. Here, too, is the Missiguash River, tacitly acknowledged by England and France of old as the boundary between their possessions, and which is now the boundary between Nova Scotia and New Brunswick. On this Isthmus we can trace the outlines of forts, battle-fields, dykes, roads, and other land-marks of the early history of the country.

The hydrographical basin of the Bay of Fundy and the topography of the Isthmus are inseparable. This Bay and its two chief arms—one terminating in Cobequid Bay, at the head of the Basin of Minas; the other terminating in Cumberland Basin, are in the general range of the great tide-wave which sweeps to the north-east along the Atlantic coast of the United States. In consequence of the contraction of the sides of the Bay of Fundy towards its head, there is a convergence of the tidal wave, which causes a very great increase in its height. The vertical height of the tide in Cumberland Basin at high spring-tides, is fifty feet; at Cobequid Bay it rises still higher; while at St. John it rises only about half this height.

Around Cumberland Basin there are about forty thousand acres of marsh, enclosed by artificial dykes, the chief part of which is on the Isthmus. This great plain is divided into sections, separated from each other—except at Cumberland Basin—by long spurs of upland, known as the Jolicure, Point de Bute, and Fort Lawrence ridges. On the east of the marshes, the town of Amherst, with its rich and picturesque scenery, spreads out before the eye; on the west, Sackville commands a view of one of the most extensive tracts of fertile land to be found in the Maritime Provinces; on the south lies *Beau Bassin*, the beautiful basin of the French pioneers; and northerly, long ranges of settlements stretch along the ridges, across the Isthmus to Baie Verte; the distance across, in the narrowest part, being fifteen miles. These ridges and marshy plains are joined to a narrow belt of upland near the head of Baie Verte. Jolicure is four miles in length; Point de Bute, nine; and Fort Lawrence, seven miles. The average width of each ridge is about a mile, and their summits do not exceed one hundred feet above the marsh. The terminal points of the two latter ridges are within a mile of Cumberland Basin. The three great arms of the marsh vary in width from one mile to four, and in length from seven to nine miles. Each is traversed by a lacustrine stream, which discharges by a deep channel into Cumberland Basin.

Nowhere in North America does nature exhibit more remarkable tidal phenomena than at this Isthmus. The proximity of the counter-tides gives force to this view. In Cumberland Basin the tide rises from thirty-five to forty-six feet over ordinary low water line, and at high spring tides over fifty feet. At times the water in Cumberland Basin is fully eighteen-and-a-half feet over that at Baie Verte; while at ebb tide the water in Baie Verte is nineteen-and-a-half feet higher than in Cumberland Basin. And at the head of the tideway in the rivers discharging into this Basin the tide rises to a still higher level. The time of high and low water is from two-and-a-half to three hours earlier at Baie Verte than in Cumberland Basin.

But how was this physical condition in the relation of land and water caused? Sir William Dawson, in his "Acadian Geology," says it was caused either by the "rupture of a barrier previously excluding the sea water, or an actual sinking or subsidence" of the land. He favors the subsidence hypothesis.

However, since the publication of his "Acadian Geology," a complete survey of the Isthmus has been made by order of the Dominion Government, with a view of uniting the waters of the Bay of Fundy with those of the Straits of Northumberland by means of a ship canal. The levels run across the Isthmus clearly show that Spring tides in Cumberland Basin are only twenty feet over the normal height of the tide in the Straits of Northumberland. That this elevation of the tide in Cumberland Basin over that of the Straits arises chiefly in consequence of the peninsular position of Nova Scotia, I have no doubt.

The original bed of Cumberland Basin may have been a shallow, fresh-water lake — a receptacle for the drainage waters of the Isthmus, which may have had their outlet over a rocky barrier to the westward. And when we consider the great depth of water in the Bay of Fundy compared to the depths farther seaward; and also in its arms, compared to the depth of water in the Straits of Northumberiand, I think it might be inferred that the present great depth of water in the Bay of Fundy and its arms is largely due to the deepening and scooping-out action, effected by the disintegrating force of the tide-wave, and not to the subsidence of the land. There appears to be a gradual increase in the elevation of the surface tide-wave, as it ascends towards the head of the tide-way in the bays and rivers, except where effected by local causes, while there is also a corresponding rise in the beds of these waters. In the Straits of Northumberland, between Cape Tormentine and Cape Traverse, where the Straits are narrowest, the ordinary depth of water at high water is only forty-two feet; in Cumberland Basin it is sixty-two feet at high water. The difference, twenty feet, being the height of the tides in the Basin above the tides in the Straits. Thus, it appears that the beds of these opposite waters have the same elevation above a common datum.

There are several places in Cumberland Basin where the tides rise and fall to a depth of twenty feet over some of the once forest-clad uplands of the country. And it is highly probable that large areas of the ancient forests underlie the adjacent marshes. Indeed, where canals for drainage have been dug, trees are met with several feet below the surface. One of the ranges of submerged forests I surveyed in 1872 extends nearly half a mile along the northerly side of Cumberland Basin. At low water it had the appearance of being the southerly slope of an upland ridge, a part of which — Tongues Island — in the adjacent marsh, may be the summit. This submerged forest is from ten to twenty feet, vertically, below high water. I counted over two hundred stumps; in all about six hundred were counted. They appeared to be in the place of their growth, like an open forest. Some of the stumps were over eighteen inches in diameter. I observed several trees lying with their tops towards the head of the Basin. The trees were imbedded in clay, mud, and small stones. One tree measured fifty and another sixty feet in length. The wood consisted chiefly of spruce and fir, with a mixture of other kinds of wood such as now grow on the Isthmus. Judging from their remarkably good state of preservation, and making allowance for the preservative effect of the salt water, it is obvious that these submerged forests belong to a modern period in geologic time.

The lakes at the head of the marshes are shallow, and form chains of quiet expansions united by short discharging channels, which in some places are overgrown by shrubbery. Within the present century the Missiguash River and chain of lakes at its head were navigable for boats from Cumberland Basin. Within the last fifty years Indian canoes in large numbers followed this route to within three miles of the navigable waters of Baie Verte. This route has ceased to be navigable for canoes. Over the portages separating the counter-waters the Indians carried their canoes on their shoulders.

At the head of the easterly arm of the Missiguash valley the water shed between the counter tidal levels is two-and-a-half miles broad, and at the crowning part only thirteen feet above high water in Cumberland Basin, or about four feet above the Saxby tide of 1869; forming, as it were, an isthmus within an isthmus. Here two extremes, the low tides of the Straits and the high tides of Cumberland Basin, almost meet. This upland ridge is composed, to a depth of five feet, of soft alluvial matter, resting on clay. So slender, indeed, is this barrier, that a few rolls of a tide in winter, but little higher than the Saxby tide, might force the waters of Cumberland Basin across the Isthmus to a level twenty feet below.

And on the side of the Isthmus facing the Straits there are in places along the terraces, or narrow marsh levels of the rivers, lines of "sea dykes." These dykes are from eight to twelve feet broad, and three to six feet high. Probably they have been much broader and higher in prehistoric times. Except where streams are crooked the dykes are on both sides, but where very crooked they sweep from one side to the other. Their bases are generally on a level with the full spring tides of the present time. I observed one place, however, where the stream formed a sharp angle near the rising upland, that the base of the dyke was from five to eight feet above tide level. These dykes or mud walls are compactly formed of river mud and other superficial matter. In exposed places, where they are being worn down by the encroachments of the sea, stumps of trees and stones are exposed to sight. The stumps appear to be in the place of their growth, and in about the same state of preservation as those in Cumberland Basin. And, where the dykes are well sheltered from the sea, I have frequently observed large spruce, pine and birch trees growing on their tops.

ARTICLE IV.

SYNOPSIS OF THE FAUNA IN DIVISION I. OF THE ST. JOHN GROUP, WITH PRELIMINARY NOTES ON THE HIGHER FAUNAS OF THE SAME GROUP.

BY G. F. MATTHEW, M. A.

(READ 6TH APRIL, 1886.)

FAUNA OF DIVISION I.

FOR the purpose of giving a condensed view of the principal characteristics of the Cambrian fauna present in Division I. of the St. John group, the writer has prepared the following synopsis of the range of the genera and species through the several zones or bands of Division I. to supplement a short article on this fauna which appeared in the Bulletin of last year.

As will be seen, this assemblage of organisms consists of three sub-faunas, which at present appear to be distinct; but it is not improbable that further investigation and the gathering of more complete collections of the fossils will show a more decided blending of these three apparently independent groupings of species. The distinctness of the sub-faunas in this division of the formation may thus in part be due to defective knowledge of the range of the organisms in it; but a real distinctness nevertheless exists, due to the changing conditions which surrounded them during the time that elapsed from the period when the first beds of *b* were deposited until the fauna of *d* occupied the Basin in full force.

As far as known the first Band* or Zone of this Division (Band *a*) is devoid of organic remains; but there is a fairly representative assemblage of organisms in the next Band (*b*) and the relation of the several portions of Division I., so far as the organisms they contain exhibits the life of the period, may be gathered from the following summary:

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* For a more complete account of the characteristics of the several parts of this formation, see Bulletin IV.

Range of Genera.

Genera peculiar to *b*,	5			
" that pass from *b* to *c*,	5			
		— 10		
" peculiar to *c*,	7			
" that pass from *c* to *d*,	15			
		— 22		
			— 32	
Deduct genera common to *b*, *c* and *d*,			5	
				— 27
Add genera peculiar to *d*,				3
Total,				30

From the above proportions it might be inferred that there is a more decided line of separation between the first and second phases of this fauna than between the second and third, but there are several considerations which should influence our estimate of the value of this apparent break; first, the number of species known in Band *b* is small, and the addition of one half to the number known might greatly modify the proportion which this table presents.

The second phase of the fauna (in Band *c*) is that which was made known by the researches of Prof. Hartt and others twenty years ago, and in this only one-third of the genera are peculiar. This sub-fauna has been more fully investigated than the others, and in the large number of genera may be regarded as the typical phase of Division I. Its close relations with the next sub-fauna is evident in the large number of genera that pass upward from it to Band *d*.

In the Band *d* we have so far only three genera peculiar to it, but this number is likely to be largely increased, because so far only the lower beds have been worked; and because a cursory examination of the lower beds of the Cambrian formation in the next basin to the north exhibits its types intermingled with genera of a higher range.

When the proportion of species peculiar to these several sub-faunas are compared, it will be seen, as might be anticipated, that the distinctions between them is greater than when the genera are made the basis for comparison. This may be gathered from the following statement:

Range of Species.

Species peculiar to *b*,	6			
" that pass from *b* to *c*,	5			
	—	11		
" peculiar to *c*,	29			
" that pass to *d*,	6			
" " " " *d* by varieties,	7			
	—	42		
		—	53	
Deduct species common to *b*, *c*, and *d*,			4	
			—	49
Add species peculiar to *d*,				16
				—
Total,				65

In this comparison by species, we see more clearly the independence of the sub-faunas occupying the Bands *b*, *c* and *d* respectively. As regards *b*, the proportion of peculiar and outgoing species is much the same as of genera, but in Band *c* it may be observed that more than two-thirds consist of species peculiar to this horizon. And the distinction between *c* and *d* is more clearly established by the species than by the genera; for while only one-sixth of the genera found in the latter Band are peculiar to it, more than one-half of the species it contains appear here for the first time.

In the case of each of these three sections it is found that one half of the species are peculiar to it, and this seems sufficient justification for designating them as independent sub-faunas of Division I. The species which link the whole together are chiefly of the Classes Brachiopoda and Pteropoda. Of these, the first is well known for the tenacity of life possessed by many of its genera, and even species; and it might be expected that many of the species would have a wide range in time. Of the other order, viz., the Pteropoda, it may be that more extended knowledge of the species will show that some of the forms regarded as connecting varieties may prove to be separate species; but at present this does not appear.

The following table shows the several classes and orders of animals which are present in the fauna of Division I., together with the number of genera, species, and varieties appertaining to each. The Protozoa are really of the rank of a sub-kingdom, but for the purposes of this paper may be ranked with the classes following:

CLASSES AND ORDERS OF DIVISION I.

WITH GENERA, ETC., IN EACH.

		Genera.	*Species.*	*Varieties.*
Sub-K.	PROTOZOA (Sponges, &c.),	3	3	1
Class	HYDROZOA (Graptolites, &c.),	2	2	0
Class	ECHINODERMATA (Seaurchins, &c.),	1	1	0
Class	BRACHIOPODA (Lampshells, &c.),	6	12	2
Class	PTEROPODA (Sea Butterflies, &c.),	2	5	4
Class	GASTEROPODA (Sea Snails, &c.),	2	7	0
Order	PHYLLOPODA?* (Phyllopod Crustaceans?)	2	3	0
Order	OSTRACODA (Ostracoid Crustaceans),	3	4	0
Order	TRILOBITA (Trilobite Crustaceans),	9	28	14
		30	65	21

As may be gathered from the above classification of the fauna of Division I., and by observation of the orders and classes of which it is composed, the fauna is thoroughly representative of the earliest Cambrian stage, and is more especially typical in the large number of genera and species of the trilobites, and in the inferior representation of the Brachiopods by small species, mostly with horny shells.

The trilobites lead off with nine genera and nearly half of the whole number of species known from this division. But perhaps the most remarkable feature in the fauna is the presence of Ostracoid Crustaceans of new and peculiar types. These belong to the oldest fossiliferous band of this formation (Band *b*). The organisms referred to the Phyllopod Crustaceans are little bivalves which, if they had more prominent umbos or less continuous or toothed hinge lines, might be suspected to be Lamellibranchs, a class which so far is known only from rocks at the summit of the Cambrian system.†

The gasteropods also contain some remarkable and peculiar types—notably Mr. Walcott's *Harttia*, and representatives of a minute univalve (*Stenotheca*) heretofore known only from the Menevian horizon in Wales and Newfoundland.

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* These may be Lamellibranchs.

† Examples lately obtained exhibit stronger resemblances to the Lamellibranchs.

Among the Pteropods of this Division were species which obtained their food and apparently passed their lives in shallow waters along the sandy shores — situations where their supposed modern congeners, when living, are never found.

The Brachiopods are all thoroughly typical of early Cambrian times, and pre-eminently so in the great number of small species with sliding, or slightly articulated valves, and corneous or phosphatic shells.

Finally, there are the Graptolites, in the Hydrozoa, and the Sponges, in the Protozoa: the former, so far as the writer knows, now for the first time recovered in connection with so old a fauna. The Sponges are carried back a step further in connection with the Acadian development of Cambrian types, since the earliest exists in the Band *c*, which carries a fauna somewhat older than the Menevian, where the oldest type of this order hitherto described (Protospongia) was found.

The above classification of the species of the Saint John Group pertaining to Division I. is based upon collections made in the Saint John Basin at three different points, one at the western end, the second at the middle, and the third at the eastern end of the Basin. But in the next basin to the North — the Kennebeccasis Basin — certain beds are found which contain a number of species showing an admixture of the forms found in Section *d* of the Saint John Basin, with others of genera which elsewhere range upward to higher horizons in the Cambrian System. Many of these fossils are mere fragments, but they present an assemblage indicative of a higher horizon than has yet been found fossiliferous in the measures of Division I. These fossils are from the south side of Kennebeccasis Bay, and may be referred to the following genera and species:

Anopolinus? sp., (pygidium).
Parabolina? sp., (").
Anomocare? 2 sp., (").
Ptychoparia, 2 sp.
Agraulos socialis, Bill. var.
Microdiscus punctatus, Salter, var?

Agnostus acutilobus (cfr. *gibbus*).
A.——— (cfr. *Nathorsti*, Brögg).
Agnostus (cfr. *parvifrons*, Linrs).
A.——— *umbo.*
A.——— *Acadicus*, Hartt, var.
Hyolithes, sp.
Linnarssonia transversa, Hartt, sp.

There is a third Basin to the North of that from which the above fossils come, lying along the Long Reach of the River

Saint John. From the beds of Division I. in this basin the species obtained are essentially those of Bands *c* and *d*, for from one locality has been obtained:

Paradoxides, sp.
Ctenocephalus Matthewi, Hartt, sp.
Conocoryphe elegans, Hartt, sp.
Ptychoparia Robbii, Hartt, sp.
Orthis, sp.

And from another a few miles to the westward:

Conocoryphe Robbii (?) and *Acrotreta Baileyi.*

PRELIMINARY NOTES ON THE HIGHER FAUNAS.

Observations on other horizons of the Saint John Group are entirely of a desultory and fragmentary kind.

I may first refer to certain fossils which have been found in the coarser beds in the city of Saint John, above the horizon of Division I., and which are characteristic of the Lingula Flags in Wales and Newfoundland. The existence of these forms and impressions at St. John has long been known. They occur both in Divisions 2 and 4, but no attempt to distinguish between the resembling forms of these two divisions of the formation has yet been made. The genera are:

Lingulella, 2 sp.
Histioderma, 1 sp.
Palœophycus, 2 sp.
Cruziania, 1 sp.

The heavy band of black slates which runs through the centre of the City of Saint John has yielded the following species, contained in calcareous nodules:

Ctenopyge (cfr.) *spectabilis*, Brögg.
Orthis (cfr.) *lenticularis*, Dal.
Kutorgina (cfr.) *cingulata*, Bill.
K——— ?

These indicate a horizon in the upper part of the Lingula flags.

A series of slates are exposed along the north side of the Kennebeccasis Basin, whose fossils indicate that they also pertain to the upper part of the Cambrian system:

Conocephalites, a species with broad free-cheek, and flaring genal spine.
Ptychoparia, a small species.
Agnostus (cfr.) *pisiformis*, Ang.
A——— (cfr.) *Richmondensis*, Wal.
Kutorgina (?) sp.
Lingulella (cfr.) *Lepis*, Salter.
L———, sp.
Eophyton Linnæanum, Torrell var.
E———, sp.
Arthraria, sp.

In none of these groupings of species do we find any indication that the St. John Group contains any beds but such as are strictly referable to the Cambrian system. It seems now, however, sufficiently clear that both great divisions of this system are present; viz.,

The *Paradoxides Zone*, or Region B. of Angelin, the Swedish palæontologist, equivalent to the (Cærfai ?) Solva and Menevian Groups of Hicks; and

The *Olenus Zone*, or Region A. of Angelin, equivalent to the several groups of strata in the Lingula flags of Britain.

ARTICLE V.

MARINE ALGAE OF BAY OF FUNDY.

BY GEO. U. HAY.

(SYNOPSIS OF A PAPER READ BEFORE THE SOCIETY, JAN. 5TH, 1886.)

IN the present paper I shall confine myself to an enumeration of a few algae found in the neighborhood of the harbor of St. John, and about Frye's Island. The list is incomplete, because only the more prominent forms have been collected. It is meagre, because the rocky and bleak shores of the Bay of Fundy furnish a habitat only for the hardiest forms of marine vegetation. When we add to this the destructive force of the tides, the chilling influence of the polar currents, we may readily see that this Bay cannot be the home of those delicate sea-weeds found further south of us, or in the same latitudes of Western Europe. Few but the more enduring forms — the Fuci and Laminariæ — with smaller growths that are parasitic upon them, can withstand the strength of the tidal currents and waves as they sweep to and fro in the Bay. If we except some retired nooks and "back" bays, there are few situations on our southern coast where many of the striking varieties of sea weeds may be found. How closely does our algic flora correspond to that of the New England States? What are the winter and spring forms that exist on our coast? And what are the differences of vegetation on the shores of the Gulf of the St. Lawrence and the Bay of Fundy? are questions that should be solved as speedily as possible; and the writer earnestly requests those who may have opportunities to collect sea-weeds to forward the less common forms to him in order that we may arrive at a more complete knowledge of our marine vegetation. All but the more delicate and perishable of the algae may be preserved by sprinkling them with a little fine sand, and drying them for a few hours.

I am indebted to Dr. FARLOW, of Cambridge, and Prof. A. B. SEYMOUR, of Madison, Wis., for aid in determining many of the species given below.

LIST OF ALGAE — 1885.

1. Ulva lactuca, *Le Jolis.*
2. U. enteromorpha, var compressa, *Le Jolis.*
3. U. enteromorpha, var ——?
4. Cladophora refracta, *Areschoug.*
5. C. gracilis, *Kütz.*
6. C. arcta, *Dillw.*
7. Scytosiphon lomentarius, *J. Ag.*
8. Desmarestia viridis, *Lam.*
9. Dictyosiphon foeniculaceus, *Grev.*
10. Ectocarpus viridis, *Harv.*
11. E. siliculosus.
12. Elachistea fucicola, *Fries*, (on Fucus Nodosus).
13. Chordaria flagelliformis, *Ag.*
14. Chorda filum, *Linn.*
15. Laminaria maxima, *Gauver.*
16. L. saccharina.
17. Agarum Turneri, *Post & Rupr.*
18. Fucus nodosus, L.
19. F. vesiculosus, L.
20. F. evanescens, *Ag. ?*
21. Porphyra vulgaris, *Harv.*
22. Ptilota serrata, *Kütz.*
23. Ceramium rubrum, *Ag.*
24. Halosaccion ramentaceum, *Ag.*
25. Ahnfeltia plicata, *Fries.*
26. Chrondrus crispus, *Stack.*
27. Rhodymenia palmata, *Grev.*
28. Delesseria sinuosa, *Lam.* x.
29. Rhodomela subfusca, *J. Ag.*
30. Polysiphonia violacea, *Grev.*
31. P. urceolata, *Grev.*
32. P. fastigiata, *Grev.*
33. Corallina officinalis, L.

ARTICLE VI.

SUMMER CAMP.

With Notes on the Marine Invertebrates of L'Etang Harbor and the Neighbouring Waters.

BY W. F. GANONG, B. A.

(ABSTRACT OF PAPER READ SEPT. 8TH, 1885.)

THE members of the second Summer Camp, held under the auspices of the NATURAL HISTORY SOCIETY, met in July last at Frye's Island, Charlotte Co. From the arrival of the first member, on the 7th, until the party broke up, on the 22nd, there were twenty persons present, some for a longer and some for a shorter time, four of whom were ladies. No systematic instruction of the younger members by the older was attempted, as had originally been intended, the exigencies of practical work preventing it. The former, however, took part in all excursions, and, doubtless, derived much good from so doing. Messrs. G. U. HAY and J. BRITTAIN, assisted by other members of the party, made a systematic study of the flowering plants of the Island, and Mr. HAY gave especial attention to the collection of the cryptogams, particularly the marine forms. The results of these investigations are partially given in the Botanical Report and the paper on Algae (Article V). The Island, comprising an area of about 1000 acres, was found to have a flora of about 300 species of flowering plants, some rarer species of which were *Stellaria humifusa*, *Cuscuta gronovii*, *Comandra livida*, *Elymus mollis*, *Hierochloe borealis*. A sheltered bay on the west side of the Island is probably one of the best collecting grounds for sea weeds to be found on our Southern coast. The Island, so far as observed, was scarcely as rich in the cryptogamic flora as in the higher forms of vegetation, with the exception of ferns, 17 species of which were observed. These grew in the greatest luxuriance on the densely shaded hillsides and ravines of this beautiful Island.

Mr. BRITTAIN devoted the greater part of his time to ornithological work, one of the interesting features of which was his success in obtaining a remarkably fine specimen of the Raven (*Corvus corax*), which he shot on Bliss Island. Messrs. G. F. MATTHEW and W. J. WILSON were present for a few days, which they spent very profitably upon the geology of the neighboring islands and mainland.* The writer of the present paper had charge of the Marine Invertebrates, Zoology, and Dredging. The Camp was most successful in all respects, both the amount and nature of the work accomplished being very satisfactory. The physical comfort of the party was not a little enhanced by the attentions of Mr. HENRY FRYE, to whom, for his great courtesy and kindness, the members of the Camp cannot be too grateful.

Dredging operations were carried on in L'Etang, Bliss, Deadman's and Beaver Harbors, in the former case to an extent sufficient to give a very good general idea of the topography of the bottom and the character of the life inhabiting it. Particular attention was paid to the relation of the different species to the physical character of the district, the height of tides, strength of currents, lithological character of the prevailing rock-masses, etc. While a mere list of species collected and their localities would be of little interest to the Society, the facts determined will be of great importance in making generalizations upon the distribution of marine life upon our coast. The fauna of the whole region is essentially Arctic, the strong tides carrying the very cold water flowing northward from the Nova Scotia coast into every bay and inlet of Charlotte County. No new species were added to those catalogued by STIMPSON and VERRILL at Grand Manan and Eastport, the conditions being the same in all of these localities.

Among the more interesting forms observed during the progress of dredging operations may be mentioned that of very fine specimens of the red "sun-star," *Crossaster papposa*, on a bottom of small *angular* stones in L'Etang; two specimens of the brachiopod, *Terebratulina septentrionalis*, were dredged in Beaver Harbor; this species does not probably occur much further up the coast, as it lives in the clearest and coldest water. At the same place a few specimens of the Tubularian hydroid, *Corymorpha pendula,* occurred, while *Tubularia indivisa* was very abundant. Several species of sponges were found in L'Etang, where also the Brittle stars, *Ophiopholis aculeata* and *Amphiura squamata,* were large and common. Specimens of the common holothurian, *Pendacta frondosa,* of enormous size, were dredged at the mouth of the latter harbor, and at the weirs of Bar Island remarkably fine specimens of another holothurian, *Lophothuria Fabricii,* together with another "sun-star," *Solaster endeca,* were abundant. Another extremely interesting star-fish, *Ctenodiscus crispatus,* was found upon mud bottoms in Beaver and Bliss Harbors, and a single specimen of the remarkable genus, *Leptasterias ?* at some point unknown. The mollusca which were dredged will be fully treated by the writer in a separate paper.

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* See "Summary of Meetings," Sept. 8, on a following page.

APPENDIX.

SUMMARY OF MEETINGS.

February 3rd.

Mr. MATTHEW read a paper on the " Earliest Forms of Life in the Cambrian formation at St. John," and also a paper by ALEX. MONRO, C. E., of Port Elgin, on the " Physical Geography and Tides of Chignecto Isthmus." (The latter is published in this Bulletin.)

March 3rd.

Mr. JAS. A. ESTEY read a paper on Physiology and Psychology, especially in relation to the brain in mammals and man.

April 7th.

Dr. L. W. BAILEY, of the University of N. B., read a paper on " A visit to the Anthracite region of Pennsylvania," giving an account of a journey through that area in company with a party of the American and British Associations of Science.

May 5th.

THE subject of consideration this evening was the selection of a suitable site for a summer camp for 1885, and discussion of the arrangements necessary in connection with holding the same. Frye's Island, in L'Etang Harbor, was decided on as a spot well suited for the purpose. On this evening a Field Club in connection with the Society was organized, for exploration around St. John, and to arrange the details of the operations at the proposed summer camp.

June 9th.

Mr. W. F. BEST, delegate to the Royal Society of Canada, gave a report of the meeting of that body held in May last, as witnessed by him on his visit to Ottawa as delegate.

September 8.

Mr. G. U. Hay gave an outline of the work carried on at the Summer Camp at Frye's Island. He also gave a sketch of the botany of the Island, stating that he had found about three hundred species of flowering plants there, and about seventeen kinds of ferns.

Mr. W. F. Ganong gave an account of the dredging operations carried on. The locality was found to have some very rich collecting grounds.

Mr. G. F. Matthew gave a sketch of the geology of the Island, stating that he had recognized the same succession of Silurian strata as is found at the Mascarene shore of Passamaquoddy Bay; and that evidence had been obtained which showed that the belt of red conglomerates extending from Black's Harbour toward Eastport were Devonian.

October 6th.

Mr. G. F. Matthew gave an address on the Pteropods (" Butterflies of the Sea"), minute shell-fish which live in the open ocean; with references to their ancient relatives in Cambrian rocks at St. John.

November 17th.

Rev. T. F. Fotheringham read an essay on the bearing of modern discoveries in science on Paley's Design Argument. He considered that these discoveries did not invalidate the argument of Paley.

December 1st.

W. S. Harding, M. D., read a paper on the " Isolation of Contagious Diseases," which elicited an interesting discussion, and was participated in by the physicians who were present.

January 5th.

Mr. G. U. Hay read an introductory paper on the Algae of New Brunswick, the substance of which appears as Article V. of this Bulletin.

January 26th.

The President read his Annual Address—" A Few Thoughts on Social Science"—which is a part of this Bulletin.

REPORT OF THE COUNCIL.

THE COUNCIL of the NATURAL HISTORY SOCIETY OF NEW BRUNSWICK beg leave to present the following report of the operations of the Society for the year 1885-6 A. D.

The roll of membership as reported by the Treasurer is as follows:—

1 Honorary.
6 Life.
46 Ordinary.
50 Corresponding, and
41 Associate Members.

During the year 10 regular meetings were held, at which the following papers were read:—

Feb'y 3. "Notes on the Isthmus of Chignecto," by A. MUNRO, Port Elgin.
March 3. "A Talk on Physiology and Psychology," by JAS. A. ESTEY.
April 7. "A Visit to the Anthracite Regions of Pennsylvania," Dr. L. W. BAILEY.
May 5. Discussion on the choice of a site for the Summer Camp.
June 9. Report of Mr. BEST, delegate to the Royal Society of Canada; and a description of the Apatite Mines of the Gatineau, G. F. MATTHEW.
Sept. 8. Description of work done at the Summer Camp, G. U. HAY and W. F. GANONG.
Oct. 6. "Pteropods," G. F. MATTHEW.
Nov. 3. "Does Modern Science overthrow Paley's Design Argument," Rev. T. F. FOTHERINGHAM.
Dec. 1. "The Isolation of Contagious Diseases," Dr. W. S. HARDING.
Jan'y 5. Introductory paper on Algae, G. U. HAY.

The Council has held 12 meetings for the transaction of business.

The Curators report that the set of cases for geological specimens, after considerable delay, owing to the difficulty of obtaining the necessary locks and brackets, has been completed, and placed in the Geology room. These cases are well adapted for the purposes for which they are intended, as they exclude the dust, and show the specimens to advantage. The Committee on Geology are now at work labelling and arranging the objects in these cases.

The most valuable additions to the Museum made during the past year are those received from the members of the Ornithological and Botanical Committees. From the former, in the specimens of native birds and eggs, which have been added to the collection from time to time; from the latter, chiefly in the valuable donations of Canadian plants received from Dr. BURGESS, of London, Ont.; Prof. FOWLER, of Kingston, Ont., and Mr. G. U. HAY, of St. John. In view of these latter donations, the Curators would again call the attention of the Council to the advisability of procuring a new case for the herbarium, the present Botanical case being insufficient for the collections now in the Society's possession. The Curators wish also to report that the Society's Rooms and Museum have been open for members and the public every Tuesday evening since the present sessions of the Society for 1885-6 began, and frequently on other nights as well. By the introduction of gas into all the rooms a great improvement has been effected, and objects in the cases can be seen to better advantage in the evening, than formerly. The chief work done in arranging the Museum has been in the departments of Geology, Ornithology, and Invertebrate Zoology (Mollusca).

The Committee on Ornithology report that they have added several nests and eggs of native birds to the collection during the past year, and have also added some specimens of birds, notably a Gyr Falcon (*F. rusticolus obsoletus*) taken within a few miles of this city. The Committee have besides this been occupied with gathering data of the distribution of the birds occurring in this Province, to be embodied in a revised catalogue, which will be issued when further information has been acquired. The Committee on Vertebrates have made some investigations into the distribution of the Mammals, especially regarding the extension eastward of the Red Virginian Deer (*Cariacus Virginianus*) and the returning of the Beaver (*Castor fiber*) to the streams from which it was, some years ago, driven by the operations of the lumberman.

The Committee on Botany report that a number of plants new to the Province have been found, and they furnish a list of such; and also a few localities in which rare forms have been found. This list is appended.

The Librarian reports that forty-eight volumes and pamphlets have been added to the Library during the year, some of which are of considerable value. The total number of volumes in the Library is 705.

The Treasurer reports that the total receipts for the year is $409.30, which with $209.98 on hand at the beginning of the year amounts to $619.28, and the expenditure is $472.95, leaving a balance on hand of $146.33. There are bills still unpaid amounting to $75.20.

Early in the Spring a Working Club was formed in connection with the Society. Under the direction of this club several rambles were undertaken in the vicinity of the city, when practical instruction was given to beginners.

The Summer Camp was also conducted under the auspices of the Club. This was held on Frye's Island, Charlotte Co., in July, at which about seventeen members were present. A very pleasant and profitable fortnight was spent in the study of Marine Zoology, under W. F. GANONG, of St. Stephen; and Botany, under G. U. HAY, of St. John. The locality chosen was a most beautiful one, and admirably suited for the pursuit of the various studies engaged in; and those who attended returned feeling that the Summer Camp of 1885 A. D. had been a real benefit to them, intellectually and physically. The Summer Camp is especially advantageous to the younger members, as it affords them an excellent opportunity to learn the practical field work of the Naturalist.

The Council again desire to acknowledge the kindness of the daily press of this city for the insertion of preliminary notices of meetings.

In conclusion, the Council feel that the past year has been one in which much valuable work has been done. Our publications are sought for by kindred societies — not only in Canada and the United States, but also in Europe — and thus our Province, with its natural resources, has been brought under the notice of many who otherwise would have remained in ignorance of its advantages. Considering these facts, the NATURAL HISTORY SOCIETV ought to commend itself to all who take an interest in science, as well as to those who desire the material progress of the country.

Respectfully submitted.

W. J. WILSON,
Rec. Secretary.

REPORT OF COMMITTEE ON BOTANY FOR 1885.

OWING to the publication of a full list of plants in the Bulletin of last year, space can only be taken in this year's issue for the following: (1) A few accidental omissions from last year's list; (2) Plants new to the Province discovered during the summer of 1885; (3) A few localities in which rare forms have been found. The number given below corresponds to the number in last year's list. A number followed by a letter *a* or *b* indicates that the plant is new to the Province, or was not numbered in last Bulletin.

20*a*. RANUNCULUS HIRSUTUS, Curtis. Ballast Wharf, St. John, 1881, *G. U. Hay.*
68*a*. Viola sagittata, Ait. St. George, *J. Vroom.*
87. Stellaria uliginosa. Burton, Sunbury Co., *Hay.*
89. S. borealis, Bigel.; and
90. S. humifusa, Rottboell. Frye's Island, *J. Brittain.*
149. Hedysarum boreale, Nutt. Elgin, A. C., *Brittain.*
223. Myriophyllum tenellum, Bigel. St. George, *Vroom.*
250*a*. Heracleum lanatum, Michx. Common in moist rich grounds. Omitted from list, 1885.
287. Solidago squarrosa, Muhl. Elgin, *Brittain.*
312. Aster puniceus, L., var. laevicaulis, Gray, of the list 1885, should be Aster tardiflorus, L.
312*a*. Aster junceus, Ait. Moncton, *Brittain.*
312*b*. A. longifolius, Lam. Bass River, 1863, *Fowler.* Omitted from list, 1885.
316*a*. A. salicifolius, Ait. St. Stephen, *Vroom.*
350. TUSSILAGO FARFARA, L., and No. 440, SYMPHYTUM OFFICINALE, at Beaver Harbor, Charlotte Co., *Hay.*

392*a*. Vaccinium Vitis-Idæa, L. Omitted from list, 1885. Very abundant on rocky hills in lower counties. Rare in Northern counties.

399. Epigæa repens, L. Dalhousie, *M. Ross.*

433. Gentiana linearis, Fresl. Derby, *Rev. A. F. Fritz.*

437*a*. Polemonium cœruleum, L. Jacob's Ladder. " In rich woods on uninhabited side of Trout Lake, Charlotte Co., along a cold stream." *Brittain.*

447*a*. CONVOLVULUS ARVENSIS, L. The *number* omitted from list, 1885.

469*a*. VERONICA BUXBAUMII, Tenore. Near St. Stephen, *Vroom.*

507*a*. Littorella lacustris, L. Shore-weed. St. George, *Vroom.*

47*a*. Euphorbia maculata, L. Near St. Stephen, *Vroom.*

549. E. CYPARISSIAS, L. Lime kiln, St. George, *Hay.*

591*a*. Corema Conradii, Torr. Abundant in sphagnous bog, rear of Carleton, *Fowler*, *Hay.* Omitted from list, 1885.

672*a*. Juncus militaris, Bigel. Moore's Mills, Charlotte Co., *Vroom.*

730*a*. Scirpus eriophorum, Michx. Common. Omitted from list, 1885.

754. Carex norvegica Schk. Back Bay, Charlotte Co., *Brittain.*

755*a*. C. exilis, Dew. Trout Lake, *Brittain.*

758. C. scoparia, Schk., var minor, Boot. McAdam Junction, 1884, *Hay.*

759. C. lagopodioides, Schk., var moniliformis, Boot. Petitcodiac, *Brittain.*

766. C. torta, Boot. St. Francis River, 1882, *Hay.* "Very abundant along the banks of Tay Creek, York Co., its roots forming a mat in the soil almost impossible to tear up. Its succulent, grassy leaves are readily eaten by cattle." *J Moser.*

784. C. oligocarpa. Tay's Mills, *J. Moser.*

799. C. filiformis, L., var latifolia. Frye's Island, *Hay.*

810. C. retrorsa, Schw. Salmon River, Victoria Co., 1884, *Hay.*

831*a*. Phalaris arundinacea, L. Rather common in wet grounds. Omitted from list, 1885.

833. Hierochloe borealis, Roem. and Schultes. Frye's Island, *Brittain.*

833*a*. ALOPECURUS PRATENSIS, L. Meadow Fox-tail. Abundant on Frye's Island, *Hay.*

848. Cinna arundinacea, L., var pendula. Frye's Island, Bocabec, *Hay.*

858*a*. Brizopyrum (Distichlis), spicatum, Hook. Marshy ground at Shediac, *Brittain.*

875. Glyceria maritima, Wahl. Frye's Island, *Hay.*

883. LOLIUM PERENNE, L. Frye's Island, *Hay,*

888. Elymus Virginicus, L. Salmon River, 1884, *Wetmore.*

890. E. mollis, Trin. White Horse Island, *Brittain;* Frye's Island, *Hay.*

905. Scolopendrium vulgare, Smith, var marginatum (S. marginatum, Moore). Peter Jack, Esq., Halifax, to whom we are indebted for the discovery of *Scolopendrium vulgare* at Woodstock in 1881, writes under date of Feb. 20th, 1886: "I have received from Miss Connell, Woodstock, a variety of this fern, which I find corresponds exactly with *S. marginatum*, of Moore. It has the longitudinal excurrent membranes on the back of the frond; is irregularly lobed and crenate. The *sori* are continued on to the upper side of the frond, a singular feature, and are short and small compared with *S. vulgare.*"

923*a*. Woodsia glabella, R. Br. This species, found by P. Jack, Esq., at Grand Falls, is restored on his authority and that of Dr. Lawson.

931. Botrychium lunarioides, Swartz, var. rutaefolium, "Rapide des Femmes, Victoria Co., P. Jack."—*Macoun and Burgess.*

932. B. simplex, Hitchcock. Petitcodiac and Fredericton, *Bailey.*
Var. subcompositum, "Dalhousie — J. Fletcher."— *Macoun* and *Burgess;* Trans. R. Soc. II., 177.

G. U. HAY,
Chairman of Committee.

DONATIONS TO THE MUSEUM,

During the year ended Jan. 19th, 1886.

Date.	Donor's Name, and Articles Presented.
1885. *Feb.*	Alex. Monro, C. E.—Stone implements and weapons from Port Elgin, Westmorland Co.
	T. C. L. Reed.—Box of native Fungi, from Fredericton.
April.	W. F. Best.—Pelican (mounted), from Pelican Lake, Regina, N. W. T.
June.	M. Chamberlain.—Common Rail.
	G. F. Matthew.—Mica, Apatite and Tourmaline in crystals from Apatite mines on the Gatineau River, Ottawa.
Sept.	T. L. Bourke.—Branch of tree, dredged at "Banks" of Newfoundland.
	C. M. Gove, St. Andrews.—Shark's Tooth, South Carolina (Eocine); Ammonite, R. R. cutting, England.
Oct.	M. Chamberlain.—Nest and Eggs of Red-eyed Vireo.
Nov.	R. R. Barnes.—Remains of Plants and Fishes from Elgin shales (sub-carbonif.).
	W. D. Matthew.—Collection, 47 species Molluscs.
	M. Chamberlain.—Gyr-Falcon and Red-necked Grebe (mounted); Eggs and Nest of Bank Swallow; Eggs of Cow Bird in Nest of Red-eyed Vireo.
Dec.	Alfred Morrissey.—Glass Sponge (Euplectella); Nests of Ruby-throated and Southern Humming Bird, "Old Squaw," Sea Pigeon (winter plumage), Woodcock (summer plumage).
	Marshall Reid, Restigouche.—Granite, China Clay, Sandstone, from Scotland, &c.; nine species of Molluscs, W. coast of Scotland.
1886. *Jan.*	M. Chamberlain.—Bonaparte Gull, Razor-billed Auk.
	Capt. Rufus Cole.—Coral Cobra, S. America.
	J. B. Williams, Toronto.—Skulls of Red-eyed Vireo, etc. (3 birds).
	Prof. Jas. Fowler, Kingston, Ont.—100 Canadian plants.
	Dr. Burgess, London, Ont.—150 Canadian plants.
	G. U. Hay.—40 species New Brunswick Algae.

DONATIONS TO THE LIBRARY,

DURING THE YEAR ENDED 19TH JAN., 1886.

Date.	Donor's Name, and Title of Book.
1885.	
Mar.	Rev. G. M. Armstrong. — Reign of Law.
April.	Belfast Naturalists Field Club — Proceedings of.
	New York Microscopical Society — Journal of.
	Canadian Institute, Toronto — Proceedings of.
	Essex Institute, Salem — Bulletin of.
May.	Academy of Nat. Sciences, Philadelphia — Proceedings of.
	United States Geological Survey — Monograph, "Comstock Mining and Miners."
	United States Agricultural Department — Report of.
	Prof. J. Macoun. — Catalogue of Canadian Plants, Parts I. & II.
June.	Linnean Society of New York — Transactions, Vol. II.
	Nova Scotian Institute of Nat. Sci. — Proceedings.
	Clifford Richardson. — Agricultural Grasses of U. States.
	Academy of Nat. Sciences, Philadelphia. — Proceedings, 1885.
	New York Microscopical Society. — Proceedings, Nos. 1, 3 and 4.
	Colorado Scientific Society. — Proceedings, 1883-4.
	American Museum of Nat. History, New York. — Bulletins, 1-5, Reports, 1-15.
	United States Geological Survey — Third Annual Report, 1881-2; Monographs, Vol. 3.
Sept.	Brockville (Ind.) Nat. Hist. Society. — Bulletin.
	British Association for Adv. of Science. — Report, 1884.
	Essex Institute. — Bulletin, Vol. 16, Nos. 7-12.
	Wyoming Hist. and Geol. Society — Proceedings, Vol. II., Part I.
	Academy of Nat. Sciences, Philadelphia — Proceedings, Part II., May to Oct., 1884.
	Ottomar Novak, Prague. — Studies on Hypostomes.
	A. C. Smith, M. D., Newcastle, N. B. — The Lobster.
	United States Geological Survey. — Geology of the Comstock Lode; Silver Lead deposits of Eureka; Palæontology of the Eureka District.
	Boston Society of Nat. History. — Proceedings, Vol. XXIII., Part I.
	New York Microscopical Society. — Journal, Vol, I., Parts 6 and 7.

DONATIONS TO THE LIBRARY—(*Continued*).

DATE.	DONOR'S NAME, AND TITLE OF BOOK.
Sept.	CANADIAN INSTITUTE, Toronto.—Proceedings.
	CANADIAN RECORD OF SCIENCE.—Vol. I., No. 2.
	GEOLOGICAL AND N. H. SURVEY OF CANADA.—Report of Progress, 1882-4.
Oct.	ESSEX INSTITUTE, Salem.—Bulletin, Vol. 17.
	MINNESOTA ACADEMY OF NAT. SCIENCE.—Bulletin, 1884-5.
Nov.	PROF. J. H. PANTON.—Rambles in the North-West.
	AMERICAN MUSEUM OF NAT. HISTORY.—Bulletin, Vol. I., No. 6
	ACADEMY OF NAT. SCIENCE, Philadelphia.—Proceedings, Part II., April to July, '85.
	G. H. LIVINGSTONE.—Partial Catalogue of the New Brunswick Flora.
Dec.	A. T. DRUMMOND, Montreal.—Distribution of Canadian Forest Trees; Forest Preservation in Canada.
	UNITED STATES DEPART. OF AGRICULTURE.—Bulletins Nos. 6 and 7.
1886. *Jan.*	OTTOMAR NOVAK, Prague.—On Genus Aristozoe.

NEW MEMBERS ELECTED DURING THE YEAR ENDED 19TH JANUARY, 1886.

ORDINARY MEMBERS.

1885. *March.*	R. T. SAUNDERS, Student, (Carleton).
May.	JAS. S. CLARKE, Student, (Carleton).
Nov.	FRANK STARR, Clerk.

CORRESPONDING MEMBERS.

Sept.	HENRY FRYE, Gentleman, Frye's Island, Charlotte Co.
1886. *Jan.*	C. HART MERRIAM, M. D., Washington, D. C., U. S.

ASSOCIATE MEMBER.

1885. *Sept.*	Miss CARRIE E. JORDAN.

OFFICERS OF THE SOCIETY FOR 1886.

Patron, His Honor Sir Leonard Tilley.
President, LeB. Botsford, M. D.
Vice-Presidents, G. F. Matthew, Edwin Fisher.
Treasurer, Alfred Seely.
Corresponding Secretary, G. U. Hay.
Recording Secretary, W. J. Wilson.
Librarian, Alfred Morrissey.
Curators, M. Chamberlain, S. W. Kain, F. W. Daniel.
Members of Council, Jas. A. Estey, D. R. Jack, W. F. Best.

STANDING COMMITTEES FOR 1886.

Physics and Chemistry, W. F. Best, G. U. Hay.
Meteorology, Gilbert Murdoch.
Mineralogy, W. F. Best, R. P. Starr, W. J. Wilson.
Geology, G. F. Matthew, R. Chalmers, W. J. Wilson.
Botany, G. U. Hay, J. E. Wetmore, J. Brittain, W. T. L. Read, J. Vroom.
Entomology, M. Chamberlain, G. Williamson, H. E. Gould.
Invertebrates, P. R. Inches, M.D., W. F. Ganong, D. R. Jack, R. T. Saunders.
Vertebrates, LeB. Botsford, M.D., M. Chamberlain, W. S. Harding M. D.
Ornithology, M. Chamberlain, A. Morrissey, F. W. Daniel.
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